I M P E R I A L   O I L   L I M I T E D

MARKETING DEPARTMENT

Vice President & General Manager
WILLIAM A. WEST

Assistant General Managers
CHARLES A. HAYLES
GEORGE N. JENKINS
GEORGE R. WISENER

111 St. Clair Avenue West, Toronto, Canada M5W 1K3

October 9, 1975

Mr. R. Horsfield
Corporate Manager - Arctic
Calgary, Alta.

Mr. G.A. Fullerton
Industrial Manager - Prairie
Edmonton, Alta.

Dear Sir:

As was agreed during our recent trip to Norman Wells, Central Office is undertaking a new strategy study regarding Norman Wells investment and operation. Attached is a letter by Mr. Dedesko which describes the approach to be taken. I believe you will agree that the study will consider all of the concerns that were expressed during our visit to the refinery.

I will see to it that you receive a copy of the conclusions and recommendations that come out of the study in advance of the presentation to P.P.M.G. so that you will have an opportunity to comment prior to seeking management approval. If you have any comments or suggestions regarding any part of the strategy study please let me know.

Yours very truly,

George

George N. Jenkins

GNJ/kr
Attach.

c.c. Mr. W. A. West
Mr. J. M. Bedard
Mr. G. H. Thomson

b.c.c. Mr. R.F. Roblin

IMPERIAL OIL ENTERPRISES LTD

111 ST. CLAIR AVENUE WEST, TORONTO, CANADA M5W 1K3

Esso

LOGISTICS DEPARTMENT

DEVELOPMENT DIVISION

G. H. THOMSON, MANAGER

October 7, 1975

Norman Wells Investment Strategy Study

File: 530.00-13

To the Gentlemen Below:

Since the last Norman Wells investment study was carried out in 1968, the forecast for the MacKenzie Valley natural gas and crude oil pipelines has slipped from 1978 to 1982 and 1987 respectively, forcing a re-evaluation of their impact upon the Norman Wells Refinery. Consequently, Development Division is undertaking a "Norman Wells Investment Strategy Study" to permit a management-approved planning approach for handling of anticipated facilities requirements until 1980 as well as a more general plan to be effective until 1990. This study, tentatively scheduled for release by year end, will investigate the following principal issues:

- Deficiencies in existing equipment (capacity, safety, environmental).
- Effects of naphtha re-injection on long range operations.
- Interface with long range plans of Marketing, Producing and Transportation.
- Ramifications of the new pricing agreement.
- Clauses in the current operating agreement which (i) could be used to advantage (ii) could cause future difficulties.
- Impact of a MacKenzie Valley natural gas pipeline.
- Impact of a MacKenzie Valley crude oil pipeline.
- Political ramifications of various strategies.

As the study is presently in the conceptual stage, any input on the general scope is welcomed from your various vantage points. More specifically, by copy of this letter, Norman Wells is requested to compile a summary of any refinery facilities presently deemed deficient or foreseen to be so within five years.

.../2

This listing, to be available by November 14, is to include all items whose scope is of sufficient magnitude to preclude their handling under a miscellaneous account during budgetory procedures.

Present intent is for a limited circulation of a preliminary issue of the study to directly affected parties prior to submission for PPMG approval

A. Dedesko

A. DEDESKO

AD/jt

cc: Messrs. H. G. Jarvis
G. H. Thomson
K. W. Briggs
W. Zukowsky - Strathcona
D. F. MacLauchlan - Strathcona
G. R. Racine - Strathcona
A. B. Lorentz - Norman Wells
T. R. Clapp
R. G. Wilson
G. N. Jenkins
J. R. Murdoch

MEMO FROM:
R.F. ROBLIN

add to ltr.

November 4, 1975

Mr. G. N. Jenkins:

Re: Arctic Steering Committee

Another item for immediate attention is the "Western Arctic Natural Gas Penetration Study" being prepared by C&LHS with input from Logistics and Marketing.

R.F.R.

/sb

pm

Mr. Jenkins:

H. G. Jarvis has read the draft (on G. H. Thomson's behalf) and has no problems with it.

In any event, HGJ plans to pass the draft along to Gord Thomson for his perusal first thing tomorrow morning should he wish to add any comments.

/sb

Called GHT am of Nov. 4; he concurs.

...M:
...E H. JENKINS

November 3, 1975

Copy to each:

Mr. C. E. Overturf
Mr. G. H. Thomson → away today - returns tomorrow ∴ passed along to HGJ to handle or
Mr. R. G. Wilson assign to someone else.

Re attached draft; may I have your comments today, please?

G.N.J.

/sb
Draft Ltr. to
WAW re Arctic
Steering Comm.

Added to pg. 2

November 4, 1975

Mr. G. N. Jenkins:

Re: Arctic Steering Committee

Another item for immediate attention is the "Western Arctic Natural Gas Penetration Study" being prepared by C&LHS with input from Logistics and Marketing.

R.F.R.

/sb

D R A F T

November 3, 1975

Arctic Steering Committee

Mr. W. A. West

For many years, Imperial has had an active interest in the development of the Arctic areas of Canada. We have substantial investments in place and as development of the North accelerates, our involvement is becoming more complex. In most ventures, Imperial's involvement requires the participation of more than one function and increasing participation of Federal and territorial governments. In many of our negotiations, the resulting agreements tend to set precedents which will affect future projects. As Imperial's commitment in the Arctic grows, a concern has been expressed by the involved functions that we need to improve communications and increase management participation in all future precedent-setting decisions.

To meet this need we are recommending the establishment of a small Arctic Steering Committee with representation from the principal functions involved in the North. The following membership is proposed:

Arctic Steering Committee

G. N. Jenkins, Marketing, Chairman
C. E. Overturf, Comptroller's
G. H. Thomson, Logistics
R. G. Wilson, Production
R. F. Roblin, Marketing, Secretary

It would be the responsibility of this Committee to consider projects and strategies which involved or affected several or all functions. There would be no involvement in the operation of any individual function. The Steering Committee would not be responsible for approving projects but only for preparing recommendations and assuring that all interested and involved functions were made aware of the planned action before seeking formal approval of the appropriate management body.

Committee members would assume responsibility for communicating with their own functional management. In addition, we would plan to circulate minutes for possible comments prior to final approval or commitment on the item. The mailing list for minutes is attached. In consideration of any individual project, participation of appropriate members of the involved departments would be requested on an ad hoc basis.

Some of the items which would receive the immediate attention of the Committee are the following:

- Arctic Petroleum Product Profitability Report to PPMG
- Norman Wells Strategy Study
- Renegotiation of Churchill Lease Agreement
- Renegotiation of Resolute Lease Agreement
- Renegotiation of Goose Bay Lease Agreement
- Northern Canada Power Corporation Contract Negotiation
- Western Arctic Natural Gas Penetration Study

If you and the management of the other involved functions concur with these recommendations, we will proceed with implementation.

GNJ/sb
Attach.

George N. Jenkins

MAILING LIST FOR ARCTIC STEERING COMMITTEE MINUTES

G. W. Carter	-	New Energy Resources
G. A. Fullerton	-	Marketing
G. L. Haight	-	Production
P. G. Hall	-	Logistics
R. Horsfield	-	Corporate Manager
H. G. Jarvis	-	Logistics
C. E. Langston	-	Marketing
P. J. Levins	-	Marketing
~~D. D. Lougheed~~	~~-~~	~~Executive~~ delete
G. R. McLellan	-	Comptroller's
V. Sirois	-	Logistics
D. E. Smith	-	Petroleum Products Coordination
J. C. Underhill	-	Arctic P.L.
W. A. West	-	Marketing
G. K. Whynot	-	Transportation

GLH version.
prefers HGJ's versi

MAILING LIST FOR
ARCTIC STEERING COMMITTEE MINUTES

G. W. Carter	-	New Energy Resources
G. A. Fullerton	-	Marketing
G. L. Haight	-	Production
P. G. Hall	-	Logistics
R. Horsfield	-	Corporate Manager
H. G. Jarvis	-	Logistics
C. E. Langston	-	Marketing
P. J. Levins	-	Marketing
G. R. McLellan	-	Comptroller's
V. Sirois	-	Logistics
D. E. Smith	-	Petroleum Products Coordination
J. C. Underhill	-	Arctic P.L.
W. A. West	-	Marketing
G. K. Whynot	-	Transportation

Nov. 4/75.

GEORGE N. JENKINS

November 4, 1975

Mr. W. A. West

Dear Bill:

In response to your suggestion regarding the need for improved communications on the Arctic, I have contacted the other functions involved and obtained their concurrence on the formation of an Arctic Steering Committee.

The attached memorandum summarizes the responsibilities of the Committee and its membership. After you have had a chance to review the proposal, I would be happy to discuss it with you.

G.N.J.

/sb
Attach.
-Nov. 4/75 memo to WAW
re Arctic Steering Comm.

MORANDUM FROM:

GEORGE N. JENKINS

November 4, 1975

Messrs. C.E. Overturf
G. H. Thomson
R. G. Wilson
R. F. Roblin

Each of you has received a draft regarding the organization of the Arctic Steering Committee and has indicated agreement with the write-up.

Attached, for your personal file, is a copy of the final memorandum to Bill West recommending implementation. Bill will be contacting each of the functional Vice-Presidents, asking his concurrence on the formation of the Steering Committee.

You may wish to discuss our recent deliberations with your own management so that they are aware of the considerations that have taken place.

G.N.J.

/sb
Attach.
-Nov. 4/75 memo to WAW re
Arctic Steering Committee

MEMORANDUM

MARKETING DEPARTMENT

November 4, 1975

Arctic Steering Committee

Mr. W. A. West

For many years, Imperial has had an active interest in the development of the Arctic areas of Canada. We have substantial investments in place and as development of the North accelerates, our involvement is becoming more complex. In most ventures, Imperial's involvement requires the participation of more than one function and increasing participation of Federal and territorial governments. In many of our negotiations, the resulting agreements tend to set precedents which will affect future projects. As Imperial's commitment in the Arctic grows, a concern has been expressed by the involved functions that we need to improve communications and increase management participation in all future precedent-setting decisions.

To meet this need we are recommending the establishment of a small Arctic Steering Committee with representation from the principal functions involved in the North. The following membership is proposed:

Arctic Steering Committee

G. N. Jenkins, Marketing, Chairman

C. E. Overturf, Comptroller's
G. H. Thomson, Logistics
R. G. Wilson, Production

R. F. Roblin, Marketing, Secretary

It would be the responsibility of this Committee to consider projects and strategies which involved or affected several or all functions. There would be no involvement in the operation of any individual function. The Steering Committee would not be responsible for approving projects but only for preparing recommendations and assuring that all interested and involved functions were made aware of the planned action before seeking formal approval of the appropriate management body.

Committee members would assume responsibility for communicating with their own functional management. In addition, we would plan to circulate minutes for possible comments prior to final approval or commitment on the item. The mailing list for

minutes is attached. In consideration of any individual project, participation of appropriate members of the involved departments would be requested on an ad hoc basis.

Some of the items which would receive the immediate attention of the Committee are the following:

- Arctic Petroleum Product Profitability Report to PPMG
- Norman Wells Strategy Study
- Renegotiation of Churchill Lease Agreement
- Renegotiation of Resolute Lease Agreement
- Renegotiation of Goose Bay Lease Agreement
- Northern Canada Power Corporation Contract Negotiation
- Western Arctic Natural Gas Penetration Study

If you and the management of the other involved functions concur with these recommendations, we will proceed with implementation.

George

GEORGE N. JENKINS

GNJ/sb
Attach.

cc: Messrs. C. E. Overturf
G. H. Thomson
R. G. Wilson
R. F. Roblin

MAILING LIST FOR MINUTES OF ARCTIC REVIEW COMMITTEE MEETINGS

MEMBERS:	Mr. G. N. Jenkins, Mr. C. E. Overturf, Mr. G. H. Thomson, Mr. R. G. Wilson, * Mr. R. F. Roblin,
MARKETING	Mr. W. A. West Mr. P. J. Levins Mr. G. A. Fullerton Mr. C. E. Langston
LOGISTICS	Mr. P. G. Hall Mr. H. G. Jarvis Mr. V. Sirois
NEW ENERGY RESOURCES	Mr. G. W. Carter
PRODUCTION	Mr. G. L. Haight
COMPTROLLER'S	Mr. G. R. McLellan
TRANSPORTATION	Mr. G. K. Whynot
PETROLEUM PRODUCTS COORD.	~~Mr. D. E. Smith~~ (D. M. Penrose - Dec. 1975)
CORPORATE MANAGER	Mr. R. Horsfield
ARCTIC PIPELINE	Mr. J. C. Underhill
Crude & Light Hydrocarbon Sales	* R. O. PFISTER
	N. Bloomer, Edmton. ? ~~Brian Thompson, Tor~~ ?
Employee Relations	R. A. Wilson

November 6, 1975

ARCTIC REVIEW COMMITTEE

Mr. D. D. Lougheed,
Building.

Your memo of September 5, 1975 on the Norman Wells Pricing agreement struck a responsive chord within the Marketing, Logistics and Production Departments. Over the past two months, the management of these three departments have developed what we feel is an appropriate devise for achieving complete integration and communication, as well as increased management participation, in all future precedent-setting decisions.

To meet this need we are recommending the establishment of the Arctic Review Committee with representation from the principal functions involved in the north. The following membership is proposed:

Arctic Review Committee

G. N. Jenkins,	Marketing,	Chairman,
C. E. Overturf	Comptroller's,	
G. H. Thomson	Logistics,	
R. G. Wilson	Production,	
R. F. Roblin	Marketing,	Secretary.

It would be the responsibility of this committee to consider projects and strategies which involve or affect several or all functions. The committee would prepare recommendations and ensure that all interested and involved functions were made aware of the planned action before seeking formal approval of the appropriate management body. However, there would be no involvement in the operation or strategy of any individual department where there were not inter-departmental implications.

Committee members would assume responsibility for communicating with their own functional management. In addition, we would plan to circulate minutes for possible comments prior to final approval or commitment on the item.

Mailing list for the minutes is attached.

In consideration of any individual project, participation of appropriate members of the involved departments would be requested on an ad hoc basis. Some of the items which would receive the immediate attention of the committee are the following:

1. Arctic petroleum product profitability report to PPMG,
2. Norman Wells strategy study including price plans
3. Renegotiation of Churchill lease agreement
4. Renegotiation of Resolute lease agreement
5. Renegotiation of Goose Bay lease agreement
6. Northern Canada Power Corporation contract negotiation ✓
7. Western Arctic Natural Gas penetration study, etc. ✓

We have reviewed this approach with Roly Horsfield and he is in complete agreement with it.

Bill
W. A. WEST

c.c. Mr. V. Sirois,
Mr. G. R. McLellan,
Mr. G. L. Haight,
Mr. G. N. Jenkins,
Mr. R. Horsfield.

MAILING LIST FOR MINUTUES OF ARCTIC REVIEW COMMITTEE MEETINGS

MEMBERS	Mr. G. N. Jenkins (Chairman)
	Mr. C. E. Overturf
	Mr. R. O. Pfister
	Mr. G. H. Thomson
	Mr. R. G. Wilson
	Mr. R. F. Roblin (Secretary)
	H.B. McGONIGAL (added Jan 2/76

* * * * * *

MARKETING	Mr. W. A. West
	Mr. P. J. Levins
	Mr. G. A. Fullerton
	Mr. C. E. Langston
LOGISTICS	Mr. V. Sirois
	Mr. P. G. Hall
	Mr. H. G. Jarvis
NEW ENERGY RESOURCES	Mr. G. W. Carter
PRODUCTION	Mr. G. L. Haight
COMPTROLLER'S	Mr. G. R. McLellan
TRANSPORTATION	Mr. G. K. Whynot
PETROLEUM PRODUCTS COORD.	Mr. D. M. Penrose
EMPLOYEE RELATIONS	Mr. R. A. Wilson
	Mr. N. S. J. Bloomer
CORPORATE MANAGER	Mr. R. Horsfield
ARCTIC PIPELINE	Mr. J. C. Underhill

December 22, 1975.

Friday, November 7

G.N.J.

Mr. West asked if I would check with you re Mr. Horsfield's approval before he releases the the attached letter to Mr. Lougheed.

Marg. S.

M E M O R A N D U M / MARKETING DEPARTMENT

November 7, 1975

Mr. W. A. West

With regard to contacting Mr. Horsfield concerning the Arctic Review Committee, I have been advised by his office that he is in the middle of a one-month vacation. He is expected to return the last week of November.

Although I am not able to reach Mr. Horsfield, I did take the opportunity to discuss with him earlier our intent to form the Committee in Central Office to consider Arctic matters. At the time, Rolly was in complete agreement and offered the comment that communications had been substantially improved already. I am completely confident that he will endorse the formation of the Arctic Review Committee.

I have written to Rolly this morning regarding this matter and have attached a copy of my memorandum to you describing the Committee responsibilities and procedures for communicating. I will discuss it with him as soon as he returns to the office.

GNJ/sb

GEORGE N. JENKINS

Esso

IMPERIAL OIL LIMITED

MARKETING DEPARTMENT

Vice President & General Manager
WILLIAM A. WEST

Assistant General Managers
CHARLES A. HAYLES
GEORGE N. JENKINS
GEORGE R. WISENER

111 St. Clair Avenue West, Toronto, Canada M5W 1K3

November 7, 1975

Mr. R. Horsfield
Corporate Manager, Arctic
Imperial Oil Limited
Calgary, Alberta

Dear Rolly,

I tried to reach you this morning but was advised by your secretary that you were fortunate enough to be on vacation.

I wanted to review with you the formation of an Arctic Review Committee in Central Office which will provide inter-functional participation in putting together Imperial's Arctic strategies. This is a subject we discussed during our recent visit to the Arctic, and the intent is to communicate with all of the departments and managers who should be involved in making policy decisions in this areas.

When you have had a chance to digest the recommendation that Bill West plans to put before Don Lougheed, I would appreciate a call. Any advice or comments that you have with regard to the functioning of this group would be very much appreciated.

I hope that the vacation was a great success, and best regards.

Yours truly,

George

George N. Jenkins
Assistant General
Manager - Wholesale

GNJ/sb
Attach.

cc: Mr. R.F. Roblin --Any comments? attached.
GNJ/sb

Date November 13/75

To: G. N. Jenkins

From: W.A. WEST

RECEIVED
NOV 18 1975
AWAY-TILL 2PM or so.
G. N. JENKINS

ARCTIC REVIEW COMMITTEE

May I please have your comments before I respond to R. O. Pfister or D.D. Lougheed.

W.A.W.

GNJ kept these.
Didn't make extra copies - RFR has copy

Att. D.D. Lougheed memo November 10
R. O. Pfister memo November 10
- Norman Wells Crude Oil Pricing

MEMORANDUM

MARKETING DEPARTMENT

RECEIVED
NOV 13 197-
G. N. JENKINS

November 13, 1975

Arctic Steering Committee
Re: D. D. Lougheed Memo
of November 10

Mr. G. N. Jenkins

I concur that Mr. Pfister should be on the mailing list of the minutes of the Arctic Steering Committee, and that he or a member of his department should attend Committee meetings dealing with pricing matters. In particular, one item to be addressed by the Committee is a study done by C&LHS with input by Marketing and Logistics of natural gas penetration in the communities along the Mackenzie River, and the ramifications of this to the Norman Wells and Strathcona operations and transportation facilities.

The assumed pipeline tariff of $1.50 per barrel in the six-year pricing plan is political in nature to ensure that pricing to the "small consumers" at Norman Wells is less than at Edmonton. "Small consumers" are defined as local customers who purchase less than 10,000 gallons a year, Northern Canada Power Commission, territorial government agencies, and Federal Government agencies. The pricing plan allows Imperial in years prior to 1980 to determine a more precise estimation of the possible pipeline tariff. Upon agreement from the Arctic Steering Committee and management, Marketing will negotiate with Indian and Northern Affairs a lesser or nil pipeline tariff.

Pricing of Norman Wells production to industrial customers will be Edmonton product prices plus full transportation costs by 1976/1977.

R F Roblin

R. F. Roblin

RFR/sb

November 13, 1975

Mr. W. A. West:

I agree that Bob Pfister should get the minutes and he or a member of his staff should sit in on Arctic meetings involving prices or freight and tariff questions. (See memo of Bob Roblin attached.)

I will be glad to discuss with Bob upon my return.

G.N.J.

/sb
Attach.
-RFR's Nov. 13/75 memo re
Arctic Steering Comm. -
DDLougheed's Nov. 10 memo.

MEMORANDUM

CRUDE AND LIGHT HYDROCARBON SALES DEPARTMENT

Mr. J. C. Underhill, 95 St. Clair
Mr. R. F. Roblin, Room 1847
Mr. K. W. Briggs, Room 1445
Mr. A. Dedesko, Room 1444
Mr. J. T. H. Cochrane, Room 745

November 18, 1975.

N.W.T. GAS STUDY

File: 06-NWT-00-00

Attached are copies of the vugraphs I used this morning modified as per your suggestions for which I thank you. Also attached is a copy of the full report which will be sent to general distribution shortly. Any comments which you have regarding it will be appreciated.

G. G. Clarke

G. G. Clarke

kf
Attachments

N.W.T. GAS STUDY

PURPOSE:- DEVELOP A POLICY RE SALE OF NATURAL GAS FOR N.W.T. CONSUMPTION

GGC
NOV. 14/75

ASSUMPTION

ALTHOUGH IMPERIAL MAY LOSE SALES OF EXISTING PRODUCTS, NATURAL GAS WILL BE DISTRIBUTED TO A DEGREE AND AT A COST ACCEPTABLE TO THE PEOPLE AND THE GOVERNMENT OF THE N.W.T.

GGC
NOV. 18/75

THE MARKET

. WESTERN N.W.T.
  - MACKENZIE VALLEY
  - GREAT SLAVE LAKE

. 18 COMMUNITIES
  - RANGE 300 - 10,000 POPULATION
  - 23,000 TOTAL (1973)
    32,000 TOTAL (1979) ESTIMATED

. NORTH/SOUTH GROUPING

GGC
NOV. 14/75

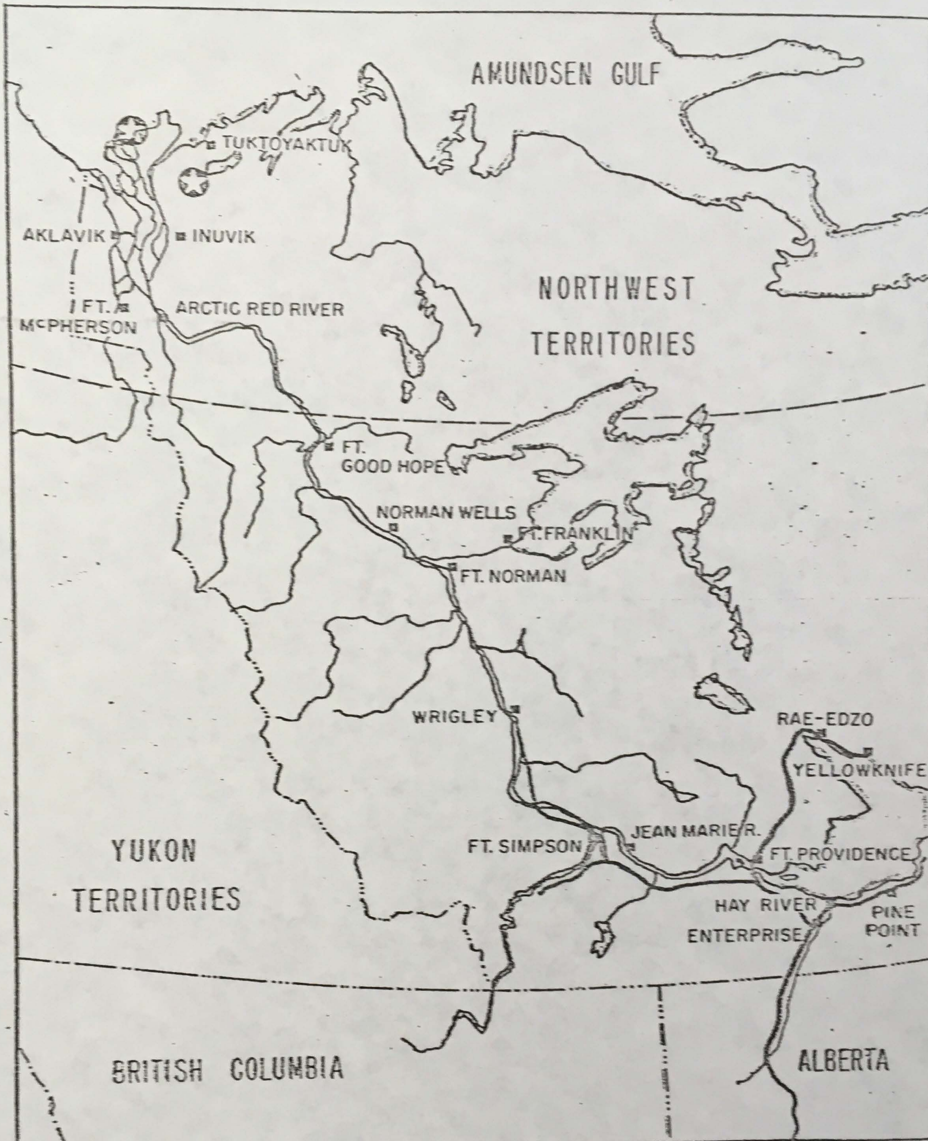
COMMUNITY	ESTIMATED POPULATION 1979
YELLOWKNIFE	9700
INUVIK	6250
HAY RIVER	4580
PINE POINT	2000
FORT SIMPSON	1670
RAE-EDZO	1580
FORT MACPHERSON	1140
AKLAVIK	890
TUKTOYAKTUK	840
NORMAN WELLS	730
FORT FRANKLIN	580
FORT GOOD HOPE	500
FORT NORMAN	350
WRIGLEY	240
ARCTIC RED RIVER	120
OLD CROW (YUKON)	290

GGC
NOV. 17/75

N.W.T. POPULATION ESTIMATES

COMMUNITY	ESTIMATED POPULATION 1979
YELLOWKNIFE	9700
INUVIK	6250
HAY RIVER	4580
PINE POINT	2000
FORT SIMPSON	1670
RAE-EDZO	1580
FORT MACPHERSON	1140
AKLAVIK	890
TUKTOYAKTUK	840
NORMAN WELLS	730
FORT FRANKLIN	580
FORT GOOD HOPE	500
FORT NORMAN	350
WRIGLEY	240
ARCTIC RED RIVER	120
OLD CROW (YUKON)	290

GGC
NOV. 17/75


AMUNDSEN GULF
TUKTOYAKTUK
AKLAVIK
INUVIK
FT. McPHERSON
ARCTIC RED RIVER
NORTHWEST TERRITORIES
FT. GOOD HOPE
NORMAN WELLS
FT. FRANKLIN
FT. NORMAN
WRIGLEY
RAE-EDZO
YELLOWKNIFE
JEAN MARIE R.
FT. SIMPSON
FT. PROVIDENCE
HAY RIVER
ENTERPRISE
PINE POINT
YUKON TERRITORIES
BRITISH COLUMBIA
ALBERTA

TYPE OF MARKET

- PRINCIPALLY RESIDENTIAL WITH A FEW COMMERCIAL CONSUMERS.
- N.C.P.C. IS PRIMARY INDUSTRIAL CONSUMER.
- COMMUNITIES ARE SMALL AND HOUSING DENSITY IS RELATIVELY LOW.

CURRENT SOURCE OF ENERGY

- IMPERIAL IS MAJOR SUPPLIER.
- PRODUCTS FROM NORMAN WELLS REFINERY SUPPLEMENTED FROM EDMONTON.
- N.C.P.C. MAJOR PUBLIC UTILITY.

GGC
NOV. 14/75

N.C.P.C.

. CROWN CORPORATION.

. REPORTS TO D.I.A.N.D.

. SERVES 54 COMMUNITIES IN N.W.T., YUKON, B.C. AND ONTARIO WITH ELECTRICITY.

. ALSO IN SOME PROVIDES WATER, HEAT, AND PROCESSES SEWAGE.

. HANDLES FUEL DISTRIBUTION IN CERTAIN COMMUNITIES.

. SELF SUSTAINING - PROJECTS MUST COVER COSTS.

. ARE STUDYING GAS DISTRIBUTION.

GGC
NOV. 18/75

ARCTIC GAS STUDY - 1

. REVIEWED 25 COMMUNITIES IN N.W.T. AND YUKON.
  - MAINLINE AND LATERALS

. ASSUMED

I) GAS PRICES	32¢/MCF AND $1.00/MCF
II) FUEL OIL	85¢/IG NORMAN WELLS (±20¢/IG)

III) TWO TYPES OF COSTING
  - COMMUNITY
  - OVERALL SYSTEM

IV) DID NOT CONSIDER CONVERSION COSTS

V) 1979 START UP

VI) 50% PENETRATION OF SPACE HEATING DEMAND AND 100% OF THERMAL GENERATING.

. QUICKIE STUDY ELIMINATED GROSSLY UNECONOMIC.

. DETAILED STUDY INCLUDING DESIGN OF DISTRIBUTION SYSTEM.

GGC
NOV. 14/75

ARCTIC GAS STUDY - 2

	AVERAGE	PEAK
. DEMAND		
- MACKENZIE VALLEY COMMUNITIES	3.5 MMCF/D	9.3 MMCF/D
- YELLOWKNIFE/HAY RIVER LATERAL	3.4 MMCF/D	10.5 MMCF/D
- WHITEHORSE LATERAL	5.6 MMCF/D	20.2 MMCF/D
- OLD CROW	.02 MMCF/D	-
. CAPITAL COST		
- MACKENZIE VALLEY	$10.3 MM	
- YELLOWKNIFE/HAY RIVER LATERAL	$34.2 MM	
- WHITEHORSE LATERAL	$139.6 MM	
- OLD CROW	$ 7.2 MM	

GGC
NOV. 14/75

ARCTIC GAS STUDY - 3

MACKENZIE VALLEY COMMUNITIES

	GAS COST *		FUEL OIL EQUIVALENT	
	COMMUNITY BASIS	SYSTEM BASIS	COST @85¢/IG	@65¢/IG
INUVIK	$1.55/MCF	$2.50/MCF	$6.40/MCF	$5.10/MCF
NORMAN WELLS	2.70	2.50	5.65	4.35
FORT MACPHERSON	4.40	2.50	6.25	4.95
FORT GOOD HOPE	4.65	2.50	6.00	4.65
FORT SIMPSON	5.10	2.50	6.10	4.75
AKLAVIK	6.55	2.50	6.40	5.10
FORT NORMAN	7.05	2.50	6.00	4.65
WRIGLEY	8.95	2.50	6.25	4.95
ARCTIC RED RIVER	14.10	NOT INCLUDED	6.20	4.85
FORT FRANKLIN	26.00	NOT INCLUDED	6.65	5.35
TUKTOYAKTUK	39.50	NOT INCLUDED	6.65	5.35

* PRICED AT $1.00/MCF AT PLANT.

GSC

Nov. 17/75

ARCTIC GAS STUDY - 4

YELLOWKNIFE/HAY RIVER LATERAL

	GAS COST *		FUEL OIL COST	
	COMMUNITY BASIS	SYSTEM BASIS		
			@85¢/IG.	@65¢/IG.
HAY RIVER	\$5.80/MCF	\$8.85/MCF	\$5.65/MCF	\$4.35/MCF
FORT PROVIDENCE	5.85	8.85	6.00	4.65
YELLOWKNIFE	10.85	8.85	6.20	4.85
PINE POINT	11.15	8.85	5.65	4.35
RAE-EDZO	15.55	8.85	6.20	4.85

COST FOR COMBINED

MACKENZIE VALLEY/YELLOWKNIFE/HAY RIVER SYSTEM

\$5.66/MCF

*PRICED AT \$1.00/MCF AT PLANT

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NOV. 14/75

ARCTIC GAS STUDY - 5

CONCLUSIONS

1) 5 OR 6 COMMUNITIES IN THE MACKENZIE VALLEY WOULD HAVE LOWER ENERGY COSTS IF SERVED WITH GAS THAN FUEL OIL DEPENDING ON THE RELATIVE OIL/GAS COST.

2) IF AN OVERALL SYSTEM PRICING BASIS WAS EMPLOYED, ANOTHER 2-3 COMMUNITIES WOULD HAVE LOWER FUEL COSTS.

3) LATERALS ARE NOT ECONOMIC TO:
   - YELLOWKNIFE/HAY RIVER
   - WHITEHORSE
   - OLD CROW
   - TUKTOYAKTUK
   - FORT FRANKLIN

4) GENERATION OF ELECTRICITY AT THE PIPELINE AND DISTRIBUTION OF ELECTRICITY IS CONSIDERABLY MORE EXPENSIVE THAN GAS DISTRIBUTION.

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PROBLEMS WITH ARCTIC GAS STUDY

1) DID NOT CONSIDER COMBINED MACKENZIE VALLEY/YELLOWKNIFE/HAY RIVER LATERALS.

2) OIL PRICES REQUIRE CONSIDERABLE ESCALATION TO REACH PRICES FORECAST CURRENT 30¢/IG. TO RISE TO 85¢/IG.

3) PURELY ECONOMIC - DOES NOT ADDRESS POLITICAL ASPECTS.

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POSSIBLE GAS DISTRIBUTORS

CAGPL

. POLICY IS TO "COOPERATE FULLY", "CARRY", POSSIBLY "CONSTRUCT" LINES FOR AND "OPERATE" FOR DISTRIBUTOR(S).

. POLITICALLY UNACCEPTABLE FOR CAGPL TO DISTRIBUTE GAS.

FOOTHILLS

. PROPOSE TO BUILD LATERALS TO COMMUNITIES ($72 MM). DISTRIBUTION TO BE DONE BY LOCAL DISTRIBUTORS.

. PROPOSE FLAT TARIFF FOR ALL GAS DELIVERED TO COMMUNITIES OR TO AGTL AT ALBERTA BORDER.

. RAISES TARIFF FROM 50¢/MCF TO 51.5¢/MCF.

. ESTIMATES $500/YEAR SAVING/CONSUMER.

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POSSIBLE GAS DISTRIBUTORS - 2

N.C.P.C.

- ARE UTILITY DISTRIBUTORS AND RESELL PETROLEUM PRODUCTS.
- ARE INVESTIGATING
- LIKELY TO BE PROPOSED BY FEDERAL GOVERNMENT
- LIKELY TO BE OPPOSED BY LOCALS AND GOVERNMENT OF N.W.T.
- SUBSIDY PROBLEM

COMMUNITIES

- 5-6 WOULD BE VIABLE. INUVIK IS MOST ATTRACTIVE.
- GNWT AND DIAND EXPECTED TO OPPOSE COMMUNITY BASIS - WOULD NOT SUPPLY YELLOWKNIFE/HAY RIVER AREA.

POSSIBLE GAS DISTRIBUTORS - 3

PUBLIC UTILITIES, PIPELINES OR PRODUCERS

- PRIVATE INDUSTRY NOT EXPECTED TO FIND MARKET ATTRACTIVE.

G.N.W.T.

- DISTRIBUTES FUEL IN SMALL COMMUNITIES CURRENTLY.
- EXPECTED TO PUSH FOR MAXIMUM DISTRIBUTION WITH FEDERAL ROYALTIES SUBSIDIZING CONSUMERS.
- RURAL GASIFICATION PROGRAM POSSIBLE.

ALTERNATIVE FUELS

- TOPPING PLANT - NOT VIABLE.
- PROPANE/BUTANE RECOVERY - UNDER REVIEW.
- CONDENSATE - UNDER REVIEW.

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NOV. 17/75

STUDY CONCLUSIONS

- SMALL MARKET - LITTLE GROWTH POTENTIAL
- GAS DISTRIBUTION COSTLY
- INUVIK AND 4-7 SMALLER COMMUNITIES VIABLE
- TUKTOYAKTUK NOT VIABLE
- SUBSIDIZATION REQUIRED
- NO OPPORTUNITY FOR IMPERIAL
- POTENTIAL LOSS OF EXISTING SALES

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NOV. 17/75

RECOMMENDED POLICY

SELL NATURAL GAS AT A PRICE AND CONDITIONS TO BE NEGOTIATED TO THE HOLDER OF A FRANCHISE TO DISTRIBUTE GAS TO THE RESIDENTS OF THE N.W.T.

GGC
NOV. 18/75

NORTHWEST TERRITORIES GAS STUDY

Introduction:- This report reviews the market potential for natural gas in the western Northwest Territories, the possible distributors of gas in the area and proposes a policy for Imperial Oil to adopt with respect to selling gas for N.W.T. consumption. Although a review of this nature has been part of C&LHS objectives for some time, commencement of the N.E.B. Mackenzie Valley Pipeline Hearings and Imperial's planned appearance at the Berger inquiry make establishment of a policy at this time desirable. Furthermore Foothills Pipe Lines recently requested that Imperial sell to Foothills about 20 MM CF/D of gas which would then be delivered to N.W.T. communities and resold to local distributors. The recommended policy, if adopted, would form the basis of responses to questions at the N.E.B. and Berger hearings and to Foothills.

Although Imperial is the major petroleum based energy supplier in the N.W.T. and will therefore stand to lose sales if natural gas is distributed, it is a key assumption of this report that natural gas will be distributed to communities in the N.W.T. to a degree and at a cost acceptable to the residents and Government of the N.W.T. This report does not review in depth the implications of the sales loss upon Imperial nor suggest any market strategy for marketing existing products.

Conclusions & Recommendations

- The market is small and widely distributed.
- Distribution of gas will be expensive as laterals are generally long and throughput is low.
- Total capital and operating costs will establish a cost of gas which is extremely competitive with existing fuels in Inuvik but less competitive to more expensive in smaller communities and large southern communities.
- Inuvik because of its proximity to the gas plants, relatively large population and remoteness from alternative fuels could be supplied with gas at the lowest cost. Savings relative to alternate fuels would be substantial.
- Six communities adjacent to the Mackenzie River could be served with gas at a lower cost than alternate fuels.

- Pricing gas on an average system cost basis would increase the number of communities to eight which could be served at a lower cost than alternative fuels.

- Gas would be more expensive than alternative fuels in the southern communities around Great Slave Lake.

- Tuktoyaktuk, the major native community (95% Inuit) is not economic relative to liquid fuels. ($39.50/MCF for gas vs. $6.65/MCF equivalent for fuel oil delivered from southern refineries).

- The type of saving to be realized will not be consistent with the expectations for extremely low cost fuel supplies.

- Government subsidization of distribution costs will be required to allow gas to be distributed at a price substantially less than existing fuels.

- Such subsidization will result in a high degree of government control over the distributor.

- This type of market will not attract private industry.

- No opportunity exists for Imperial Oil to market gas. Penetration of gas will result in loss of existing product sales in the area which will negatively affect income.

- It is recommended that Imperial's policy be that Imperial will enter into negotiations to sell gas to any group which can demonstrate that it has a franchise to distribute gas in the N.W.T. No position should be adopted at this time as to the terms and conditions such a contract would contain.

- A reply be made to Foothills declining to negotiate with them but identifying that we will negotiate with the distributor who has the franchise.

a) The Market

i) General

Natural gas is expected to compete with existing energy sources in the residential, commercial, and industrial market sectors and in the thermal generation of electricity and/or heat.

The market area where natural gas is expected to present competition to existing fuels is in the western Northwest Territories in the Mackenzie Valley and Great Slave Lake Areas.

The following market characteristics are relevant:

- The area studied contains 18 communities with an estimated population of about 23,000 (1973). CAGPL projects the population to be 32,000 by 1979 and 37,000 by 1982. This increase results from natural resource development and construction of the natural gas pipeline. (See Table I)

- The major market segments are concentrated either at the extreme north end of the Mackenzie Valley or in the Great Slave Lake area (approximately 600 miles apart). (See map attached)

- Imperial has a long history of involvement in the area and is currently the major supplier of fuel. Products are supplied from Norman Wells refinery supplemented by Edmonton products delivered to Hay River by rail and barged to communities. Shifts to natural gas will cause existing business to decline and may make remaining services more expensive.

- In general, the communities have small populations and housing is widely spaced relative to southern communities.

- The economy of the area is related principally to natural resource development, hunting and fishing and the associated secondary industry. Military and Government functions are also major factors in the economy.

ii) <u>Other Market Factors</u>

- The population is largely composed of native peoples, ie. Inuit and Indian. They claim ownership of the land and resources and wish to determine the degree and manner in which the resources are developed. The expectations of the native groups are high and are not likely to be satisfied.

- Due to the poor intrinsic economy of the area and the large native population, residents receive substantial subsidization and are attuned to this type of support.

- The native population is somewhat alienated towards southern Canada residents, and the Federal government. It is generally felt that southerners intend to exploit this area without reasonable and fair compensation to northerners. As development commences, many feel this alienation will increase due to an influx of southern residents and the inflationary pressures which may be created by a project of this magnitude.

iii) <u>Studies of Market</u>

A report prepared for CAGSL by Associated Engineering Services Limited, Northern Engineering Services Company Limited, and Gemini North Ltd., entitled "Impact of Proposed Arctic Gas Pipeline on Energy Costs in Northern Communities" was used as the source document for this report with minor modifications. A summary of

that report is attached. The key points of the CAGSL report are: (see Table I and II for details)

	Mackenzie Valley Communities	Yellowknife and Hay River Area Communities
Population (1979)	13,300	18,700
Gas Needs		
Annual	1,286 MMCF/yr.	1,245 MMCF/yr.
Daily Average	3.5 MMCF/D	3.4 MMCF/D
Peak Day	9.3 MMCF/D	10.5 MMCF/D
Capital Cost of a gas distribution system including laterals.	$10.3 MM	$34.2 MM
Capital $/Person	775	1,825

The demands are based upon 50% penetration of the space heating market and 100% of the thermal electric generation market. These numbers may be optimistic as conversion costs, which the consumer would have to bear, are not included in the proposal.

The report considered two methods to allocate costs to consumers: i) a community basis or ii) an overall system basis.

Two costs were tested for purchased gas i) 32¢/MCF and ii) $1.00/MCF at the plant gate. This was compared to a "most likely" fuel oil cost of 85¢/I plus transportation from Norman Wells. (The fuel oil cost was based upon crude oil being priced at $20/B in Norman Wells in 1979. This compares with the current fuel oil cost of 30 ¢/IG at Norman Wells.)

Cost of Gas to Consumers*

Mackenzie Valley	Community Basis	Overall Basis	Overall Including Yellowknife Lateral**	Estimated Equivalent Fuel Oil Cost @ 85¢/IG	65¢/IG
	$/MCF	$/MCF	$/MCF	$/MCF	$/MCF
Inuvik	1.55	2.50	5.65	6.40	5.05
Norman Wells	2.70	2.50	5.65	5.65	4.35
Fort McPherson	4.40	2.50	5.65	6.25	4.95
Fort Good Hope	4.65	2.50	5.65	6.00	4.65
Fort Simpson	5.10	2.50	5.65	6.10	4.75
Aklavik	6.55	2.50	5.65	6.40	5.05
Fort Norman	7.05	2.50	5.65	6.00	4.65
Wrigley	8.95	2.50	5.65	6.25	4.95
Yellowknife Lateral					
Yellowknife	10.85	8.85	5.65	6.20	
Hay River	5.80	8.85	5.65	5.65	

*Only $1.00/Mcf case for gas purchase price is shown. Subtract 68¢/Mcf to show costs for 32¢/Mcf case.

**Not included in CAGPL study. Derived from CAGPL Data.

On these bases, the Yellowknife lateral was rejected as more costly than fuel oil. Natural gas service would be less costly only for five Mackenzie Valley communities on a community costing basis and eight on an overall system basis. The communities in which fuel costs are reduced are Inuvik, Fort Simpson, Fort McPherson, Norman Wells and Fort Good Hope plus on an overall basis, Aklavik, Fort Norman and Wrigley.

b) Natural Gas Distributor Alternatives

In determining who might undertake the responsibility for handling distribution, the following groups were reviewed:

i) Canadian Arctic Gas Pipeline Limited (CAGPL)

- CAGPL's policy on supplying gas to the N.W.T. is to "cooperate fully with any entity which desires to consider or has decided to carry on the purchase of gas and the construction of gas distribution facilities in the various communities. Such entities may include private companies (now in existence or to be formed) or governmental agencies." Arctic gas would transport gas purchased by such entities and would consider constructing and operating on their behalf laterals to connect their distribution facilities with CAGPL.

- A higher level of involvement is unlikely due to the political unacceptability to American participants in CAGPL of subsidization of Canadian consumers. Only direction by the Canadian Government could change this position.

- Under commodity pricing, any subsidies granted by CAGPL will reduce the producer's netback.

ii) Foothills:-

- Foothills has announced that it will include laterals to service the N.W.T. in its basic pipeline system and roll the cost into its tariff. Gas will be purchased and sold to community distributors at cost plus the same transportation cost as Foothills will charge for delivery of gas into AGTL at the N.W.T./Alberta border. This will raise the tariff on gas going to southern customers from 50¢/MCF to 51.5¢/MCF.

- Foothills states southern Canadian consumers will therefore be subsidizing northerners but in fact under commodity pricing, the producer will pay.

- Inuvik would have higher gas costs as the tariff Foothills proposes is considerably higher than the CAGSL study suggested.

- Foothills estimates an annual saving of $500/customer but no details have been revealed. Foothills estimates an additional capital cost of $72MM to build the laterals.

iii) Northern Canada Power Commission (N.C.P.C.)

- NCPC is a Federal crown corporation which distributes public utilities in the N.W.T., Yukon and other places as recommended by the government. It currently distributes electricity in 54 communities in the N.W.T., Yukon, B.C. and Ontario. Although primarily an electrical distributor, NCPC also does distribute heat and water and processes sewage in a few communities. NCPC reports to Parliament through the Minister of Indian Affairs and Northern Development (DIAND).

- NCPC's authorizing act requires that projects undertaken are to be self sustaining; ie. operations, maintenance, administration, interest, principal repayment and contingency reserves must be recovered. No provision is made for subsidization of service.

- NCPC are currently investigating distribution of natural gas in the N.W.T. NCPC have not approached Imperial for a gas supply. It is believed NCPC view themselves as the logical distributor of gas.

- Although NCPC may expect to establish gas distribution services, public reaction is expected to be negative as NCPC is generally unpopular in the area. DIAND on the other hand can be expected to support NCPC. In NCPC, the government has an operating entity which knows the market and would not require a profit.

iv) Public Utilities, Pipelines or Producers

- Privately owned companies are not expected to find the N.W.T. gas market attractive due to the extremely small market and high projected distribution costs combined with the potential dissatisfaction of Northerners if a low cost energy source is not obtained. Government subsidies will be required to make the economics favourable. Future growth does not appear to be a sufficient inducement to industry.

- No opportunity is seen for such companies to develop this market.

v) Government of N.W.T. (GNWT)

- The Government of the N.W.T. currently distributes fuel in numerous communities too small to support a privately run agency including many of the communities which expect to receive natural gas.

- The GNWT exercises jurisdiction over all Government activities in the N.W.T. with the exception of natural resources. Gas distribution would be within their jurisdiction; however, use of royalties to subsidize gas distribution would not be feasible unless changes in legislation were to occur. GNWT may therefore use pipeline and other taxation as the bases to subsidize the cost unless DIAND takes positive action. Such a program would

be consistent with the rural gasification program in Alberta and the programs of rural electrification in numerous provinces.

vi) Community Groups

- The CAGSL report indicates that the cost of natural gas will be lower than competitive fuels in six communities (Table II). Inuvik because of both its large size, proximity to the field and distance from alternate fuels would have the lowest cost gas. Inuvik's council is aware of this situation and has passed a by-law to retain the distribution franchise at a civic level although its jurisdiction is questionable. Strong opposition to Inuvik proceeding alone is expected from the Government of the N.W.T. and the Government of Canada (DIAND, NCPC). If Inuvik were to proceed alone, it is unlikely that the over all system basis would be viable. Nearby Tuktoyaktuk (80 miles) would be particularly concerned by the wide variance in costs. ($39.50/Mcf vs. $1.55/Mcf)

- This type of servicing with the exception of Inuvik is not considered feasible unless subsidized.

Other Fuels

a) Fuels Currently Used in the Area

Norman Wells and Edmonton are the current supply points for petroleum products into the N.W.T. Penetration of gas into the heating market would first eliminate Edmonton product and then reduce Norman Wells crude running. Logistics reviewed the effect of loss of the majority of the thermal electric market and of gas obtaining a high penetration of the heating market in the communities. They concluded that Norman Wells refinery would experience a large amount of flaring of heavy fuel oil if other product demands were to be met. Competitive action to maintain markets would be required or serious consideration would have to be given to shutting down the refinery. The effects of a shutdown have not been assessed.

A study was made in 1974 of a topping plant to produce specification diesel and turbo fuel to be built on Richards Island. Due to the poor economics shown at that time, this study was not updated.

b) LPG or Stabilized Condensate

- Producing department are currently reviewing the economics of LPG distribution in the northern section of the Mackenzie Valley. Such a proposal might include liquid recovery and stabilization at Richards Island, pipelining or seasonally storing and barging to Tuktoyaktuk, Aklavik and Inuvik followed by road distribution to Arctic Red River and Fort McPherson and potentially into the Yukon. Distribution to the southern market areas is not viable.

- In the Inuvik market area, LPG would be an attractive fuel as it would not require the major distribution system that gas requires,

is clean burning and could satisfy transportation needs as well. However if extracted from natural gas, it would reduce the revenue available from such sales unless priced on BTU equivalence basis. If propane were required to be extracted to meet the Arctic pipeline dew point specifications, a lower cost might be reasonable rather than re-injection.

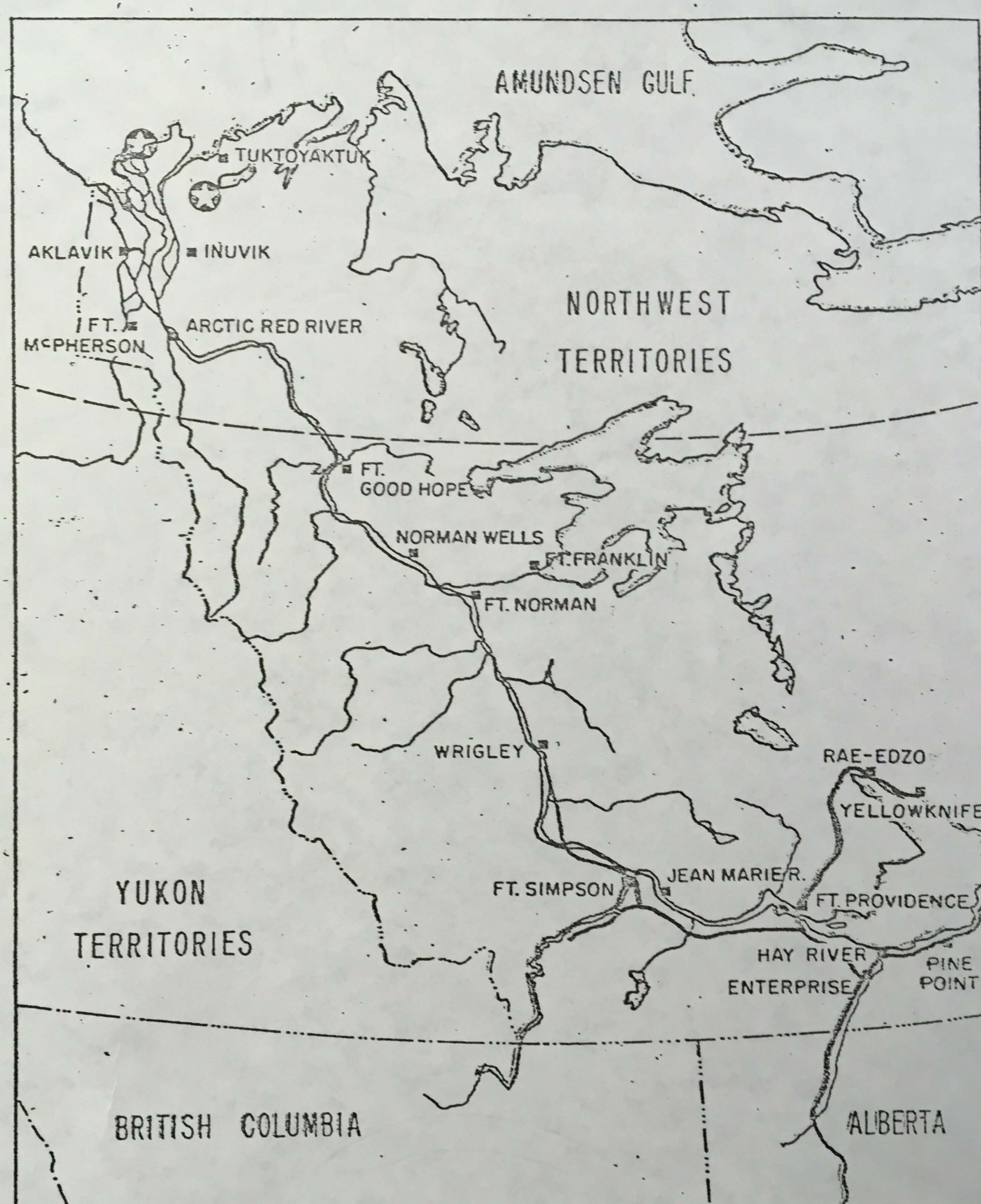
- Stabilized condensate would be a desirable fuel for thermal generation but would not likely be suitable for space heating. Although it could be priced reasonably relative to re-injection, no substantial market is foreseen as gas would still be installed to meet space heating needs.

G. G. Clarke

G. G. Clarke

kf
Attachments

CLH-36



AMUNDSEN GULF
TUKTOYAKTUK
AKLAVIK
INUVIK
FT. McPHERSON
ARCTIC RED RIVER
NORTHWEST TERRITORIES
FT. GOOD HOPE
NORMAN WELLS
FT. FRANKLIN
FT. NORMAN
WRIGLEY
RAE-EDZO
YELLOWKNIFE
JEAN MARIE R.
FT. SIMPSON
FT. PROVIDENCE
YUKON TERRITORIES
HAY RIVER
PINE POINT
ENTERPRISE
BRITISH COLUMBIA
ALBERTA

TABLE I

N.W.T. GAS STUDY

PROPOSED PIPELINE LATERALS AND COSTS

Community	Estimated Population 1979	Pipeline Lateral Miles	Pipeline Lateral Size	Total System*** $MM(1979)	Capital Cost/Person
Yellowknife	9700	460	Various	34.2 *	$1825/perso
Inuvik	6250	11	4 1/2	2.59	415
Hay River	4580	**	-	**	1825
Pine Point	2000	**	-	**	1825
Fort Simpson	1670	20	4 1/2	2.80	1675
Rae-Edzo	1580	**	-	**	1825
Fort McPherson	1140	5	2 3/8	1.09	955
Aklavik	890	12	2 3/8	1.63	1830
Fort Providence	870	**	-	**	1825
Tuktoyaktuk	840	88	4 1/2	7.23	8610
Norman Wells	730	2.4	2 3/8	.76	1040
Fort Franklin	580	67	2 3/8	4.82	8310
Fort Good Hope	500	2.5	2 3/8	.61	1220
Fort Norman	350	4.3	2 3/8	.74	2115
Wrigley	240	2	2 3/8	.47	1960
Arctic Red River	120	8.4	2 3/8	.62	5170
Total	32,040			58	1800
Old Crow (Yukon)	290	108	2 3/8	7.22	

* Yellowknife/Hay River/Pine Point/Rae-Edzo Lateral Includes: 295 miles of 8 5/8"
126 " of 6 5/8"
37 " of smaller.

** Included in Yellowknife data

*** Lateral plus Distribution System

Source - Appendix A, D - CAGSL "Impact of Proposed Arctic Gas Pipeline on Energy Costs in Northern Communities"

TABLE II

N.W.T. GAS STUDY

GAS USAGE & ESTIMATED TARIFFS

Community	Estimated Population 1979	Estimated Population 1982*	Estimated Gas Use MMcf/yr	1979 Peak Day MMcf/D	CAGSL Estimated Cost of Gas (Wellhead at $1.00/Mcf) Community Basis ($/Mcf)	CAGSL Estimated Cost of Gas (Wellhead at $1.00/Mcf) System Basis	Estimate Equivalent Fuel Oil ¢/Mcf
Yellowknife	9700	11320	560	4840	10.85	8.85	6.20
Inuvik	6250	7040	885	6310	1.55	2.50	6.40
Hay River	4580	5570	500	4010	5.80	8.85	5.65
Pine Point	2000	2170	140	1290	11.15	8.85	5.65
Fort Simpson	1670	1730	145	1127	5.10	2.50	6.10
Rae-Edzo	1580	1660	45	360	15.55	8.85	6.20
Fort McPherson	1140	1380	60	410	4.40	2.50	6.25
Akl[illegible]k	890	1000	50	340	6.55	2.50	6.40
Fort Providence	870	1050	45	350	5.85	8.85	6.00
Tuktoyaktuk	840	980	30	N/A	39.50	Not included	6.65
Norman Wells	730	840	90	700	2.70	2.50	5.65
Fort Franklin	580	760	35	N/A	26.00	Not included	6.65
Fort Good Hope	500	570	30	210	4.65	2.50	6.00
Fort Norman	350	400	20	160	7.05	2.50	6.00
Wrigley	240	280	10	80	8.95	2.50	6.75
Arctic Red River	120	140	10	N/A	14.10	Not included	6.20
	32040	36890	2655	20190			
Old Crow (Yukon)	290		20		60.00	Not included	

Source - CAGSL "Impact of Proposed Arctic Gas Pipeline on Energy costs - Northern Communities"

*Escalated on growth rate projection for each community

SUMMARY OF CAGSL REPORT entitled

"Impact of Proposed Arctic Gas Pipeline on Energy Costs in Northern Communities" September 1974.

- Considered supply of gas to 25 NWT & Yukon communities. As well as supply to Mackenzie Valley communities, these included communities to be served by the following laterals:

  a) Yellowknife and south shore of Greater Slave Lake
  b) to Whitehorse through Macmillan Pass
  c) to Fort Franklin on Great Bear Lake
  d) to Old Crow

- Two bases were used to develop cost comparisons for Mackenzie Valley communities

  a) Individual community pricing
  b) Overall system pricing for a group of communities which passed preliminary screening

  Similar comparison were carried out for communities to be serviced by laterals, however the overall system pricing did not include these laterals.

- Startup of CAGSL was assumed in 1979. Costs and population were escalated to a 1979 bases.

- Two possible well head prices for gas were considered; 32¢/Mcf and $1.00/Mcf.

- The competitive fuel was considered to be fuel oil supplies from Norman Wells or Edmonton. A price of 85¢/IG ±20¢/IG was estimated which is equivalent to $21 crude oil in Edmonton.

- It was assumed that gas obtained 50% of the space heating demand and 100% of the thermal generating load in each community.

- The CAGSL report concluded for the Mackenzie Valley that:

  1) Natural gas priced on a community pricing basis would reduce the cost of fuel to residents of Inuvik, Norman Wells, Fort McPherson, Fort Simpson, Fort Good Hope and Aklavik.

  2) On an overall system basis, the above communities plus Fort Norman and Wrigley would benefit from reduced fuel costs.

  3) The majority of savings occur in Inuvik as it represents 2/3 of the possible demand and is located close to the gas fields

- For communities to be served by laterals:

  1) Fuel costs would not be reduced in communities served by any of the laterals reviewed.

2) The cost of gas delivered through the Yellowknife - Hay River lateral would be about 1/3 higher than competitive fuels based upon the overall system basis.

3) The cost of gas through the Whitehorse lateral would be double alternative fuel costs.

- This above analysis does not include conversion costs for existing customers. The saving realized by Mackenzie Valley customers considered economic would pay the conversion cost in 1-2 years.

- The report does not:

  a) discuss the change in field prices between 1973 and 1979 - ie 22¢/IG rising to 85¢/IG.

  b) combine the Mackenzie Valley and Yellowknife/Hay River systems. This results in a reduced savings (19% & 8%) respectively and makes the Yellowknife lateral viable.

- CAGSL's stated policy following receipt of this report is that it "stands ready to cooperate fully with any entity which desires to consider or has decided to carry on, the purchase of gas and the construction of gas distribution facilities in the various communities. Such entities may include private companies, (now in existance or to be formed) or governmental agencies." It "would transport gas purchased by such entities to an appropriate offtake point on its pipeline." Furthermore, it would on behalf of distributors, construct and operate laterals should this be economic and desirable.

GGC
OCT. 9/75

D. D. LOUGHEED

MEMORANDUM

TAX DEPARTMENT

NOV 21 1975

ATTENDED TO

November 21, 1975

Norman Wells Agreement

Mr. E D.K. Martin
Building.

George Jenkins of the Marketing Department is Chairman of our Arctic Review Committee, which was recently formed to look into various problems in the Northwest Territories. He should fully understand the taxation problem at Norman Wells, as it can be used as an argument for a higher crude price at Norman Wells. Would you please send him a copy of your letter of October 22 to Mr. Thompson and his replyof November 15, and then discuss it with him to make sure that he understands.

My interpretation of Mr. Thompson's reply is that though he does not refer to carried interest specifically, he includes it like any other payment to the government.

D.D. Lougheed

D. D. LOUGHEED

c.c. Mr. G.L.Haight

October 22, 1975.

Norman Wells Agreement

Mr. A.E.J. Thompson,
Director,
Corporations & Business Income Division,
Tax Policy & Federal-Provincial Income Division,
Department of Finance,
Place Bell Canada,
Ottawa, Ontario.
K1A 0G5

Dear John:

This is further to our conversation at the Tax Executives Institute reception on the evening of Thursday, September 11th, when we discussed the possible application of paragraphs 12(1)(o) and 18 (1)(m) of the Income Tax Act to the payments Imperial Oil makes to the Government of Canada in respect of the production from the Norman Wells oil field.

Imperial Oil is the operator of the Norman Wells field under the terms of the "Norman Wells Unit Agreement" between Imperial Oil Limited and the Government of Canada dated July 21, 1944. Under this agreement, the Government of Canada receives:

(i) one-third of the wellhead value of the crude oil saved after deducting one-third of producing costs and a further 10% of such one-third costs as a management fee, and

(ii) a 5% gross royalty on Imperial's two-thirds share of the crude oil produced and saved.

The Norman Wells Unit Agreement arose out of Imperial's discovery in the early Twenties -- Imperial's leases covered two-thirds of the pool, and lands retained by the Crown covered the other one-third of the pool. To provide for efficient operation of the pool and to avoid duplication, the parties agreed that

Imperial would put up all the capital for the development of the field, operate it and account to the Crown for their share as set out above.

It now appears that the amounts paid to the Crown under the above provisions may be included in Imperial's taxable income because of the two income tax paragraphs mentioned above. Unfortunately, these share of profit and royalty payments to the Crown are considerably greater than the resource allowance is expected to be. Our best estimates for 1975 show that the two Crown payments will aggregate about $1,252,000, whereas the resource allowance (if it were applicable in 1975) would only amount to about $820,000. It appears to us that if these Crown payments are indeed taxed to us under the above-noted provisions, it will be an inequitable situation which should be corrected. This long standing agreement between Imperial and the Government of Canada has nothing whatever to do with the differences which exist between Ottawa and certain provincial capitals.

While the amounts involved are not very great, this is an illustration of what could happen in the Arctic and why we are so concerned about some aspects of Syncrude.

I enjoyed discussing this and the other matters with you. No doubt Syncrude will bring us together again very soon!

Yours very truly,

EDKMartin/lh

Finance Finances

Ottawa, Ontario,
K1A 0G5,
November 15, 1975

Mr. E.D.K. Martin,
Imperial Oil Linited,
111 St. Clair Avenue, W.,
Toronto, Ontario
M5W 1K3

Dear Mr. Martin:

I have received your letter of October 22, 1975 relating to the application of paragraphs 12(1)(o) and 18(1)(m) to payments made by your company to the federal government in respect of production from the Norman Wells oil field.

It was, of course, the government's intention to include in the taxable income of a producer, royalty payments made by the producer to the Crown in right of Canada or a Province. This would then include royalty payments made to the Federal Government in respect of production in the North West Territories. Although the disallowance of such payments do not have a direct relationship to the difficulties which arose with provincial royalties, the federal government felt it was important to have consistent treatment for all royalty type payments regardless of which level of government they are paid to. To do otherwise might give the federal government an unfair advantage or create undesirable market distortions when taxpayers were deciding which resources to develop.

I trust that this information will be helpful to you.

Yours sincerely,

A.E.J. Thompson,
Director,
Corporation and Business
Income Division,
Tax Policy and Federal
Provincial Relations Branch.

Ottawa, Ontario
K1A 0G5

Ottawa, Ontario
K1A 0G5

MEMORANDUM FROM
GEORGE N. JENKINS

December 10, 1975

Mr. W. A. West,

Bob Pfister has been invited to our Arctic Committee and is planning to attend. He will decide later what he wants his longer term participation to be.

G.N.J.

WILLIAM A. WEST

Copy to R.F. Roblin
Nov. 17/75 in GNJ's absence
P.A.

November 14, 1975

RECEIVED
NOV 14 1975
G. N. JENKINS

Mr. R. O. Pfister,
Building

Norman Wells Crude
Oil Pricing

Thank you for your note of November 10th on this subject.

Attached is a memo from Bob Roblin to George Jenkins which explains a little more of the detail behind the pricing arrangement with the Government. Also attached is a memo to Don Lougheed suggesting the formation of an Arctic Review Committee. We feel that it would be a good idea for you to be a member of this Committee when discussing the pricing of crude and light hydrocarbons in the Northwest Territories.

By copy of this memo to George Jenkins I have asked for him to make arrangements for your attendance and receipt of the minutes.

George will be away for the next week but upon his return he will contact you to discuss the crude oil pricing arrangement in further detail.

W. A. WEST

c.c. Mr. D. D. Lougheed
Mr. G. N. Jenkins

Att.

MEMORANDUM FROM:
GEORGE N. JENKINS

November 13, 1975

Mr. W. A. West:

I agree that Bob Pfister should get the minutes and he or a member of his staff should sit in on Arctic meetings involving prices or freight and tariff questions. (See memo of Bob Roblin attached.)

I will be glad to discuss with Bob upon my return.

G.N.J.

/sb
Attach.
-RFR's Nov. 13/75 memo re
Arctic Steering Comm. -
DDLougheed's Nov. 10 memo.

DEPARTME

3, 1975

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MEMORANDUM

MARKETING DEPARTMENT

November 13, 1975

Arctic Steering Committee
Re: D. D. Lougheed Memo
of November 10

Mr. G. N. Jenkins

I concur that Mr. Pfister should be on the mailing list of the minutes of the Arctic Steering Committee, and that he or a member of his department should attend Committee meetings dealing with pricing matters. In particular, one item to be addressed by the Committee is a study done by C&LHS with input by Marketing and Logistics of natural gas penetration in the communities along the Mackenzie River, and the ramifications of this to the Norman Wells and Strathcona operations and transportation facilities.

The assumed pipeline tariff of $1.50 per barrel in the six-year pricing plan is political in nature to ensure that pricing to the "small consumers" at Norman Wells is less than at Edmonton. "Small consumers" are defined as local customers who purchase less than 10,000 gallons a year, Northern Canada Power Commission, territorial government agencies, and Federal Government agencies. The pricing plan allows Imperial in years prior to 1980 to determine a more precise estimation of the possible pipeline tariff. Upon agreement from the Arctic Steering Committee and management, Marketing will negotiate with Indian and Northern Affairs a lesser or nil pipeline tariff.

Pricing of Norman Wells production to industrial customers will be Edmonton product prices plus full transportation costs by 1976/1977.

R F Roblin

RFR/sb

R. F. Roblin

Arctic Steering Committee

Goose Bay

Opportunity Volume Previously Supplied by USA

		MG	GOV'T. DEPT.
Diesel			
	Central Heating Plant - pipeline	11,000	DPW
	House Deliveries - T/T 270 houses	500	DPW
	Pinetree - Melville Base - pipeline	500	CAF
Turbo B	Into-Plane Service	1,000	CAF
80/87	Into-Plane Service	15	CAF
115/145	Into-Plane Service	85	CAF
#2 Mogas	Pipeline or T/T	100	MOT
		13,200	
	or	377 MB	

from RFR

Goose Bay

MOT/DPW Plan

Close down the MOT Facility IOL Leases

Move to USAF side and utilize 1 MMB of the 2 MMB storage

Close down Sea Line

- 230 ft. pipeline for Turbo B, Av Gas, Mogas
- 3500 ft. pipeline for Diesel

Close down Heating Plant using Bunker 45 MB

Implement Management Consultant Report

Goose Bay

Objective

Retain Base Load Business

Gain Gull Island

Gain Volume Previously Supplied by USAF

Maintain or Improve Profitability

Goose Bay

MOT/DPW Assumptions November 4/75 Montreal Meeting

1 Year Extension

IOL supply all Canadian Government Volume

IOL operate MOT and USAF Facilities

Hydro from Churchill Falls not available until end 1977

DPW provide maintenance and snow removal at USAF facility and be responsible for risk

Sea-line will be activated at Gov't. expense for 1976 re-supply

No trans-shipments to Pacer and DEW sites.

Goose Bay

Present Situation

IOL Owned and Leased Facilities

- 5 year lease of MOT facility, 360 MB, expired June 30, 1975 and was extended 1 year with profit improvement.
- Property lease with MOT for IOL owned tankage, 134 MB, and pipeline to MOT dock can be extended 5 years to June 30, 1981.
- IOL lease 125 MB of storage from MOT at USAF facility. Terms as above with MOT facility.
- IOL volume thru above tankage July 1/75 to June 30/76 570 MB.

USAF pulling out June 30, 1976

- storage 2.1 MMB
- volume opportunity 377 MB

Gull Island Hydro Electric Project started up 1975

- IOL volume 1975 77 MB
- Volume opportunity 1976 to 1981 403 MB

Goose Bay

Present Situation (continued)

Competition - Golden Eagle own and operates 85 MB storage

- who controls MOT and USAF tankage controls the major volume

Volume July 1/76 to June 30/77

		MB
IOL Base Load		500
Opportunity - Gull Island		90
- USAF Facility		380
	Total	970

MOT/DPW have requested IOL to take over the operation of the USAF facility for 1 year, July 1/76 to June 30/77 and supply the USAF volume of 377 MB. IOL lease of MOT facility to be also extended to June 30, 1977.

Goose Bay

USAF Situation

USAF pulling out June 30, 1976 with possible 3 month phase-out extension. End of 20 year contract plus 3½ year extension.

MOT will manage the air operation.

DPW will manage all other Crown land and buildings.

Subject to Cabinet approval.

DSS Management Consulting Service will fine tune the responsibilities

- study not available till December/75 and subject to many reviews.

U.S.A.F. inventory June 30/76

	MB
Diesel	50
Turbo B	770
Av Gas 115/145	6
Mogas	3

Further status of USAF at Goose Bay

Inventory
On-going presence or 100% pull-out

Goose Bay

Work Plan

Central Office Logistics

Opportunity Volume Supply - Domestics, Import

- Vessels

Quebec Transportation

Visit USAF facility and report operational feasibility

Current Costs

Additional Costs of Operating USAF

Wholesale Operations

Economics Present Bases of Pricing vs. Going to Tender

Price Control Guidelines

Develop Strategy

i.e. 3 year extension
Basis of Pricing

Reviews

Negotiations with MOT, DPW, DSS

R. F. ROBLIN
November 1975

File Arctic
Steering Com

EASTERN ARCTIC PROFITABILITY

1975 - RE-SUPPLY

LOACTION	VOLUME		PROFIT A.T.	R.O.C.E.
	MB		$M	%
RESOLUTE	250	300M Leased from MOT 150M Imp storage	1227	25.2
STRATHCONA SOUND	51	Lead Zn mine	136	22.2
FROBISHER BAY	197	Leased	410	32.4
DECEPTION BAY	155	Cust. storage	98	27.4
CHURCHILL	241	Leased	141	8.0
GOOSE BAY	587	Leased + some Imp.	768	15.7
	1481		2780	20.2

NOTES:
1. INTEGRATED RETURN
2. SUPPLY: DOMESTIC 46%
   IMPORT 54%
3. DOMESTIC PRODUCT COST: FULL + 0% RETURN
4. IOL MARINE FREIGHT COST FULL + 0% RETURN
5. CAPITAL EMPLOYED: $13.7 MM

WHOLESALE OPERATIONS
DEC. 1975

EASTERN ARCTIC PROFITABILITY

1975 RE-SUPPLY

CAPITAL EMPLOYED

	$ MM
INVENTORY	6.1
RECEIVABLES	3.2
LIABILITY CREDIT	(1.6)
MARINE	2.5
LOGISTICS	2.2
PLANT FACILITIES	1.3
	13.7

WHOLESALE OPERATIONS
DEC 1975

EASTERN ARCTIC PROFITABILITY

ITEMS REQUIRING FURTHER INVESTIGATION

- DEUMRRAGE AND WHARFAGE ACTUAL AND ESTIMATES NOT AVAILABLE
- IMPORT LAID DOWN COSTS ARE ESTIMATED
- VAGARIES IN REPORTING SYSTEM OF PLANT, COMMISSION AND THRU-PUT COSTS
- LOGISTICS & MARINE CAPITAL EMPLOYED
- ARCTIC NOD.C.O.

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DEC. 1975

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1975 ACCOMPLISHMENTS

- CHURCHILL AND GOOSE BAY LEASES NEGOTIATED WITH IMPROVED PROFITABILITY
- REDUCTION OF DISCOUNTS AT RESOLUTE AND FROBISHER ON CONTRACT ROLL-OVERS
- REDUCTION IN INVENTORY
- POSTED PRICE INCREASES RECOVERED:
  - INCREASE IMPORT COST
  - DOMESTIC PRICE INCREASE 4.8¢/gal.
  - REDUCTION IN THE AMOUNT OF SPECIAL ARCTIC COMPENSATION 2.10 reg., 3.60 Arctic
  - ADDITIONAL WORKING CAPITAL TO OFF-SET HIGHER COST PER BARREL OF INVENTORY
  - 2.2¢ PER GALLON NON-CRUDE PRICE INCREASE First cargo- July
- A NO ACCIDENT SEA LIFT
- RETAINED DIRECT CARGO MINING CUSTOMERS EVEN WITH COMPETITIVE PRESSURES
- MAINTAINED MARKET SHARE

WHOLESALE OPERATIONS
DEC. 1975

NORMAN WELLS PRICING

PRICING CONTROLLED BY ORIGINAL 1944 AGREEMENT WITH CROWN

2/3 CRUDE IMPERIAL'S

1/3 CRUDE GOVERNMENT's

OVER LAST 13 YEARS ONLY 4.4¢ PER GALLON INCREASE (AFTER MANY CONFRONTATIONS)

THE MINISTER HAS APPROVED A SIX YEAR PRICING PLAN

AFTER TAX $ MM, %   1/3 CRUDE PURCHASE IS DEDUCTIBLE

	YES		NO	
	NET PROFIT	RETURN	NET PROFIT	RETURN
1974	1.0	10.3	0.7	6.9
1975	1.5	12.5	1.1	8.5
1980 EDMONTON CRUDE				
$13./BBL	4.2	19.3	2.9	13.2
$16./BBL.	5.2	23.8	3.3	15.3

DEC 1975

IMPERIAL SUPPLY

HAY RIVER AND NORTH

MB	1974	1975
STRATHCONA	800	825
NORMAN WELLS	650	740
TOTAL	1,450	1,565

GOOSE BAY

OBJECTIVES

- NEGOTIATE 3 YEAR LEASE EXTENTION OF GOVERNMENT FACILITIES
- MAINTAIN OR IMPROVE PROFITABILITY
- MAINTAIN PREFERRED AVIATION POSITION
- GAIN C.I.R.T. AND AVIATION VOLUME PREVIOUSLY SUPPLIED BY U.S.A.F
- GAIN GULL ISLAND HYDRO DEVELOPMENT VOLUME: C.I.R.T.
- RETAIN TRANS-SHIPMENTS: CONSUMER
- RETAIN OTHER BUSINESS LINE VOLUME: C.I.R.T., CONSUMER, AUTOMOTIVE

GOOSE BAY

STRATEGY

- HIGHLIGHT IOL YEARS OF EXPERIENCE AND EXPERTISE AT GOOSE BAY
- GOVERNMENT'S PLANS WILL TAKE LONGER THAN A YEAR OR TWO AND OPERATION AND CHANGES TO FACILITIES WILL BE MUCH SMOOTHER IF IOL HAVE THREE YEAR TENURE
- OFFER TO PUT AN IOL SALARY EMPLOYEE AT GOOSE BAY AS TERMINAL MANAGER
- TAKE 115/145 AVGAS INVENTORY ON HAND AT U.S.A.F. ON A CONSIGNMENT BASIS
- DOMESTIC SUPPLY AND IOL VESSELS BUT FLEXIBILITY TO SWING TO IMPORT
- BASIS OF PRICING SIMILAR TO CHURCHILL NEGOTIATIONS
- 2½¢ PER GALLON THRU-PUT FEE TO APPLY TO ALL VOLUME THRU IOL AND IOL LEASED FACILITIES EXCEPT FEE WOULD BE 1.18¢ PER GALLON ON TRANS-SHIPMENTS
- GOVERNMENT TO ASSUME ALL M & R AND RISK OF ALL POL FACILITIES
- IOL OPERATE THE POL FACILITIES BUT NOT HANDLE COMPETITIVE PRODUCT

Goose Bay

Present Situation

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- 5 year lease of MOT facility, 360 MB, expired June 30, 1975 and was extended 1 year with profit improvement.
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- volume opportunity 377 MB

Gull Island Hydro Electric Project Possible Start-Up 1976

- Volume opportunity 1976 to 1982 480 MB

WHOLESALE OPERATIONS
DEC. 1975

10 a.m. Dec. 10/75

Mr. Jenkins:

Mr. Newcombe Bloomer of E.R. Department, Edmonton, called.

He would like to be added to the distribution list for the Minutes of the Arctic Review Committee, and also suggested that Mr. Brian Thompson of E.R. Dept., Toronto (Asst. Mgr. E.R. Dept.) be added.

Mr. Bloomer will be giving the presentation on the 17th at the meeting with Mr. Horsfield re Native Employment Study. Mr. Bloomer feels he should receive the minutes because most of the operating plans in the North have an employee impact, e.g., the pricing situation at Norman Wells.

P.A.

PROPRIETARY

M E M O R A N D U M

MARKETING DEPARTMENT

RECEIVED
NOV 24 1975
G. N. JENKINS

November 21, 1975

Arctic Steering Committee
N. W. T. Gas Study

Mr. G. N. Jenkins
Room 1815
Building

A meeting was held by the Arctic Steering Committee November 18, 1975 to review the N.W.T. Gas Study done by Mr. G. G. Clarke of C. & L.H.S. Department with input by Marketing, Logistics and other Departments.

Attached are the vu-graphs used and a copy of the full report.

I have not sent copies of this report to the complete mailing list of the Arctic Steering Committee minutes as the study will be reviewed by other Corporate Committees.

R F Roblin

R. F. Roblin
Product Advisor

RFR:sl
Encl.

cc: W. A. West
G. A. Fullerton - Edmonton
C. E. Langston - Ottawa
D. E. Smith

MEMORANDUM FROM
GEORGE N. JENKINS

December 9, 1975

Mr. W. A. West,

Attached letter from Roly Horsfield indicates complete satisfaction with the Arctic Steering Committee. I think we are making real progress and that communications regarding the Arctic will be much improved in the future.

G.N.J.

Enc.

file Arctic Rev. Comm.

IMPERIAL OIL LIMITED

500 SIXTH AVENUE SOUTH WEST, CALGARY, ALBERTA T2P 0S1

Esso

R. HORSFIELD
CORPORATE MANAGER – ARCTIC

December 1, 1975

Mr. G. N. Jenkins
AGM, Marketing Department
Toronto Office

Dear George,

Confirming my comments to you relative to the proposed Arctic Review Committee in Central Office, I have the following comments.

1. I think formation of this committee is an excellent step which should ensure a co-ordinated approach to Arctic matters.

2. I would appreciate receiving copies of the minutes on an informational basis because I need to know what actions are being considered and what decisions are made. This will allow me also to provide input when necessary.

3. I have a date to review our corporate Native Employment Study with D. D. Lougheed on December 18 p.m. in Toronto. Perhaps this study would be an appropriate item for this Committee to review because, otherwise, Functional Managements will only see that portion developed within their own Department. If you agree, I would suggest the review should take place either on December 17 or in the morning of December 18 before the meeting with Mr. Lougheed. Please advise.

Yours truly,

R. Horsfield

R. Horsfield

RH:mm

December 10, 1975

Mr. R. Horsfield
Imperial Oil Limited
Calgary

Dear Roly,

Thanks for your letter of December 1 regarding the Arctic Steering Committee.

I have talked with Bert Shea about his Corporate Committee Meeting and am advised that it will be in the morning. Accordingly, I have set up a meeting of the Arctic Steering Committee to hear your Native Employment Study for 3:30 p.m. on December 17 in Room 1143C. If this doesn't suit, please let me know.

I am looking forward to your visit. Best regards.

Yours very truly,

George N. Jenkins

GNJ/pa

D. D. LOUGHEED

MEMORANDUM

RECEIVED
DEC 12 1975
G. N. JENKINS

December 11, 1975

Native Employment Policy - NWT
December 18 - Presentation

Copy to each:

Mr. G. L. Haight
Mr. P. G. Hall
Mr. G. N. Jenkins
Mr. P. Stauft
Mr. J. C. Underhill
Mr. R. A. Wilson

noted

On December 18, at 2:15 p.m., in the Board Room, Mr. Roly Horsfield, in conjunction with Messrs. Zukowsky, Bloomer and McPherson, will be making a presentation to me on a proposed policy for the employment of native residents in the Northwest Territories. I believe that you gentlemen may be interested in attending this presentation.

D. D. Lougheed

D. D. LOUGHEED

for Dec. 17/75

M E M O R A N D U M

MARKETING DEPARTMENT

December 11, 1975

Arctic Steering Committee

Messrs. G. N. Jenkins
R. O. Pfister
R. G. Wilson
G. G. Thomson
C. E. Overturf

RECEIVED
DEC 11 1975
G. N. JENKINS

A meeting has been called 3.30 December 17, 1975 in room 1143-C to review a study by Messrs. R. Horsfield and N. Bloomer regarding:

"Training & Development of Nature People for Employment at Norman Wells"

The Minister of Indian and Northern Development, Judd Buchanan, in his July 31, 1975 approval of a six year Norman Wells pricing plan made specific reference that price increases 1976 and subsequent years will depend on the development and implementation by Imperial of appropriate programs at Norman Wells to promote the training and employment of nature people.

R F Roblin

R. F. Roblin

RFR:sl

cc: K. W. Briggs

PROPRIETARY

MINUTES OF ARCTIC REVIEW COMMITTEE MEETING

DECEMBER 12, 1975

Members: Messrs. G.N. Jenkins, Chairman
R.O. Pfister
R.G. Wilson
G.H. Thomson
C.E. Overturf

I. 1975 ARCTIC PROFITABILITY

Mr. R.F. Roblin presented the preliminary integrated profitability of the 1975 re-supply to the Eastern Arctic. There are areas that require further investigation and when these items are resolved the Committee will be reported to. It is expected that the Federal Government will be calling tenders this month for the supply of the Government's fuel requirements and operation of their petroleum storage facilities at Churchill, Manitoba for a 5 year period commencing September 1, 1976.

The Norman Wells pricing plan and profitability was presented by Mr. R.F. Roblin. Because the actual 1975 Norman Wells profitability will not be available until early March 1976 and the necessity of integrating this with the profitability of Strathcona support, the 1975 profitability of the Western Arctic will not be available until the end of March.

II. GOOSE BAY NEGOTIATIONS

Mr. R.F. Roblin presented Marketing's objectives and strategy in regards to negotiations taking place for a lease extension of the Government petroleum facilities and supply of the Government's fuel requirements of 520 MB per year. In addition Imperial supplies 430 MB per year to the private sector.

III. OTHER ITEMS

The group discussed the purpose of the Committee and strongly supported that there is a definite need for this type of Committee in view of the inter-departmental responsibilities in the Arctic and their necessary and increasing contact with the various departments of Government with the possibility that precendents could be established which could adversely affect future projects.

Meeting adjourned.

R.F. Roblin
Secretary

December 15, 1975

Minutes of Arctic Review
Committee Meeting Dec. 12/75

Attendees: Messrs. G.N. Jenkins
R.O. Pfister
R.G. Wilson
G.H. Thomson
C.E. Overturf
G.G. Clarke
K.W. Briggs

cc: Messrs.
N.S.J. Bloomer - Edmonton
G.W. Carter
G.A. Fullerton - Edmonton
G.L. Haight
P.G. Hall
R. Horsfield - Calgary
H.G. Jarvis
C.E. Langston - Ottawa
P.J. Levins
G.R. McLellan
V. Sirois
D.M. Penrose
R.A. Wilson
J.C. Underhill
W.A. West
G.K. Whynot

PROPRIETARY

EASTERN ARCTIC PROFITABILITY

1975 - RE-SUPPLY

LOCATION	VOLUME	PROFIT A.T.	R.O.C.E.
	MB	$M	%
RESOLUTE	250	1227	25.2
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4. IOL MARINE FREIGHT COST FULL + 0% RETURN
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WHOLESALE OPERATIONS
DEC. 1975

EASTERN ARCTIC PROFITABILITY
1975 RE-SUPPLY

CAPITAL EMPLOYED

	$ MM
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WHOLESALE OPERATIONS
DEC 1975

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- ARCTIC N.D.C.O.

WHOLESALE OPERATIONS

DEC. 1975

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WHOLESALE OPERATIONS

DEC. 1975

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HAY RIVER AND NORTH

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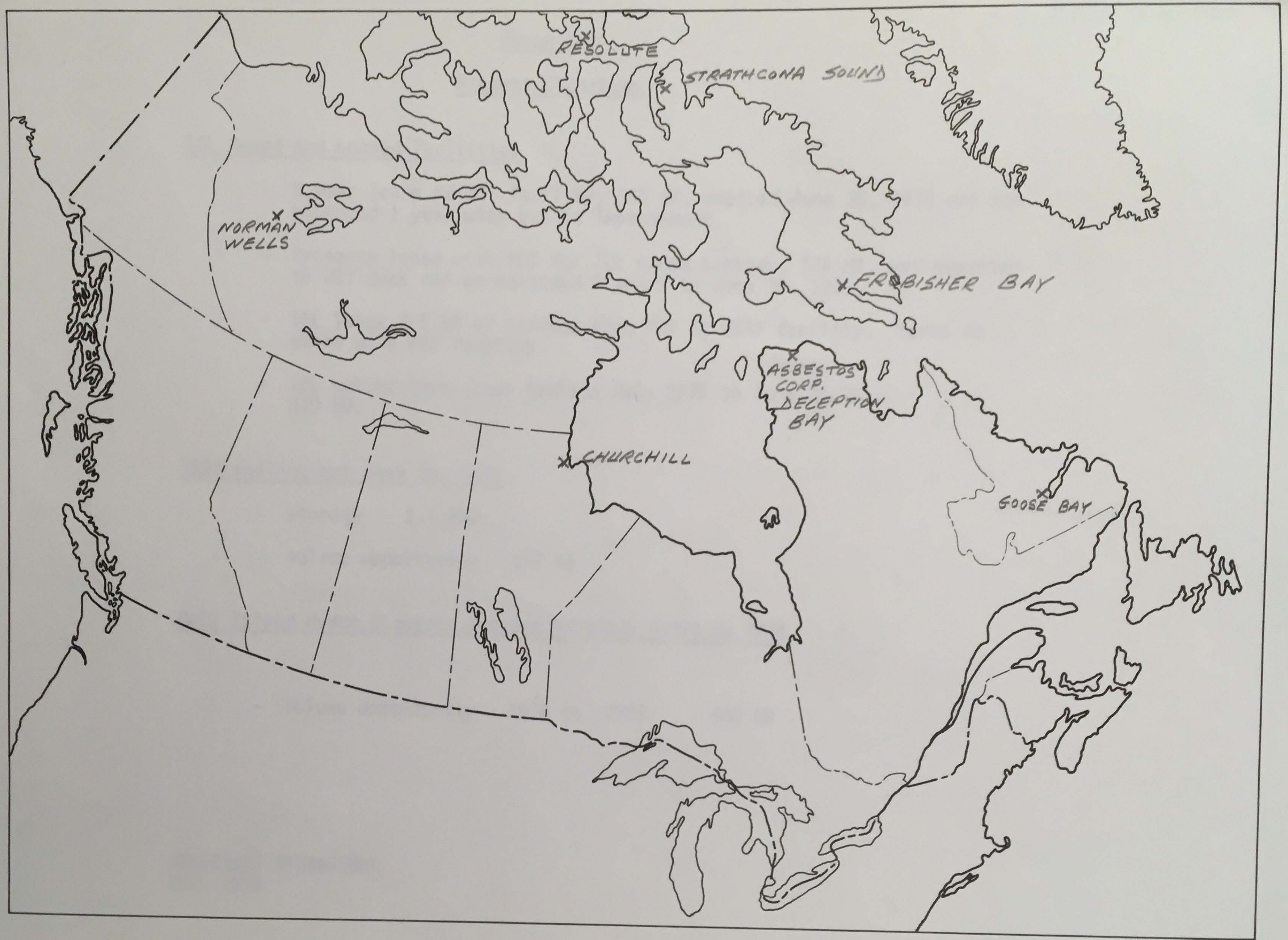
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NORMAN WELLS
FROBISHER BAY
ASBESTOS CORP.
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CHURCHILL
GOOSE BAY

Goose Bay

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WHOLESALE OPERATIONS
DEC. 1975

PROPRIETARY

GOOSE BAY

OBJECTIVES

- NEGOTIATE 3 YEAR LEASE EXTENTION OF GOVERNMENT FACILITIES
- MAINTAIN OR IMPROVE PROFITABILITY
- MAINTAIN PREFERRED AVIATION POSITION
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- RETAIN TRANS-SHIPMENTS: CONSUMER
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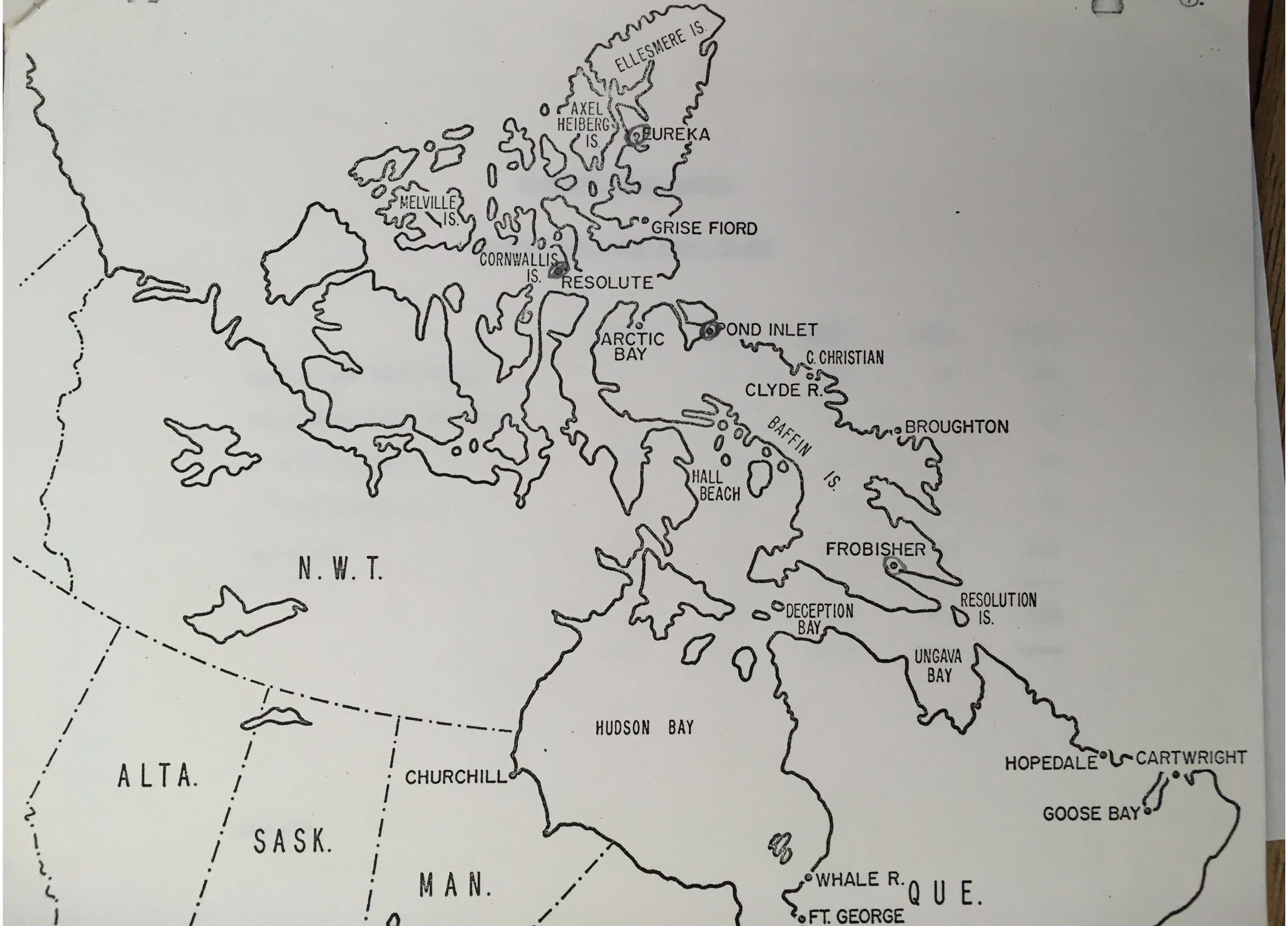
- BASIS OF PRICING SIMILAR TO CHURCHILL NEGOTIATIONS
- 2½¢ PER GALLON THRU-PUT FEE TO APPLY TO ALL VOLUME THRU IOL AND IOL LEASED FACILITIES EXCEPT FEE WOULD BE 1.18¢ PER GALLON ON TRANS-SHIPMENTS
- GOVERNMENT TO ASSUME ALL M & R AND RISK OF ALL POL FACILITIES
- IOL OPERATE THE POL FACILITIES BUT NOT HANDLE COMPETITIVE PRODUCT

IMPERIAL'S PARTICIPATION IN EASTERN HIGH ARCTIC

* MAP
* HISTORICAL VOLUMES 1968 - 1972
* 1972 PROFIT ANALYSIS
* DEMAND FORECAST 1972 - 1980
* CASH FLOW PROJECTIONS
* RISK FACTORS
* 1973 PLANS
* CONCLUSION

MAR/73

1.-


ELLESMERE IS.
AXEL HEIBERG IS.
EUREKA
MELVILLE IS.
GRISE FIORD
CORNWALLIS IS.
RESOLUTE
POND INLET
ARCTIC BAY
C. CHRISTIAN
CLYDE R.
BROUGHTON
BAFFIN IS.
HALL BEACH
FROBISHER
N. W. T.
RESOLUTION IS.
DECEPTION BAY
UNGAVA BAY
HUDSON BAY
HOPEDALE
CARTWRIGHT
GOOSE BAY
ALTA.
CHURCHILL
SASK.
MAN.
WHALE R.
QUE.
FT. GEORGE

EASTERN HIGH ARCTIC

ACTUAL VOLUMES 1968-72 MB

	1968	1969	1970	1971	1972
RAE POINT (MELVILLE)	--	--	42	83	109
ELLESMERE-AXEL HEIBERG	--	--	--	--	92
BAFFIN ISLAND	25	26	27	28	29
LITTLE CORNWALLIS	6	8	8	10	12
RESOLUTE	40	74	194	250	411
	71	108	271	371	653

MAR/73

EASTERN HIGH ARCTIC

1972 VOLUME & SUPPLY SOURCE

(IMPERIAL SUPPLY)

	MB	SOURCE
RAE POINT (MELVILLE)	109.0	ROTTERDAM
ELLESMERE-AXEL HEIBERG	92.0	MONTREAL
BAFFIN ISLAND	29.0	MONTREAL
LITTLE CORNWALLIS	12.0	MONTREAL
RESOLUTE	206.0	MONTREAL
RESOLUTE	205.0	ARUBA
TOTAL	653.0	

MAR/73

RESOLUTE PROFITABILITY: 1972

$M

	EX MONTREAL	EX ARUBA	TOTAL
VOLUME (MB)	206	205	411
TOTAL REVENUE (EX S.T.) ($M)	3187	3186	6373
COSTS:			
-- MARKETING	73	72	145
-- TERMINAL OPERATION	585	585	1170
-- TRANSPORTATION	407	620	1027
-- LOGISTICS	1020	827	1847
NET REVENUE BEFORE INCOME TAX (BOOK BASIS)	1102	1082	2184 ($5.31/B)
CAPITAL INVESTMENT - FACILITIES			1070
WORKING CAPITAL			2075

EASTERN HIGH ARCTIC PROFITABILITY: 1972

$M

	RESOLUTE	OTHER	RAE
VOLUME (MB)	411	133	109
TOTAL REVENUE (EX S.T.)	6373	705	-
COSTS	4189	645	-
NET REVENUE BEFORE INCOME TAX (BOOK BASIS)	2184	60	-
PER BARREL	5.31	.44	0

MAR/73

(MB) DEMAND FORECAST -- EASTERN HIGH ARCTIC

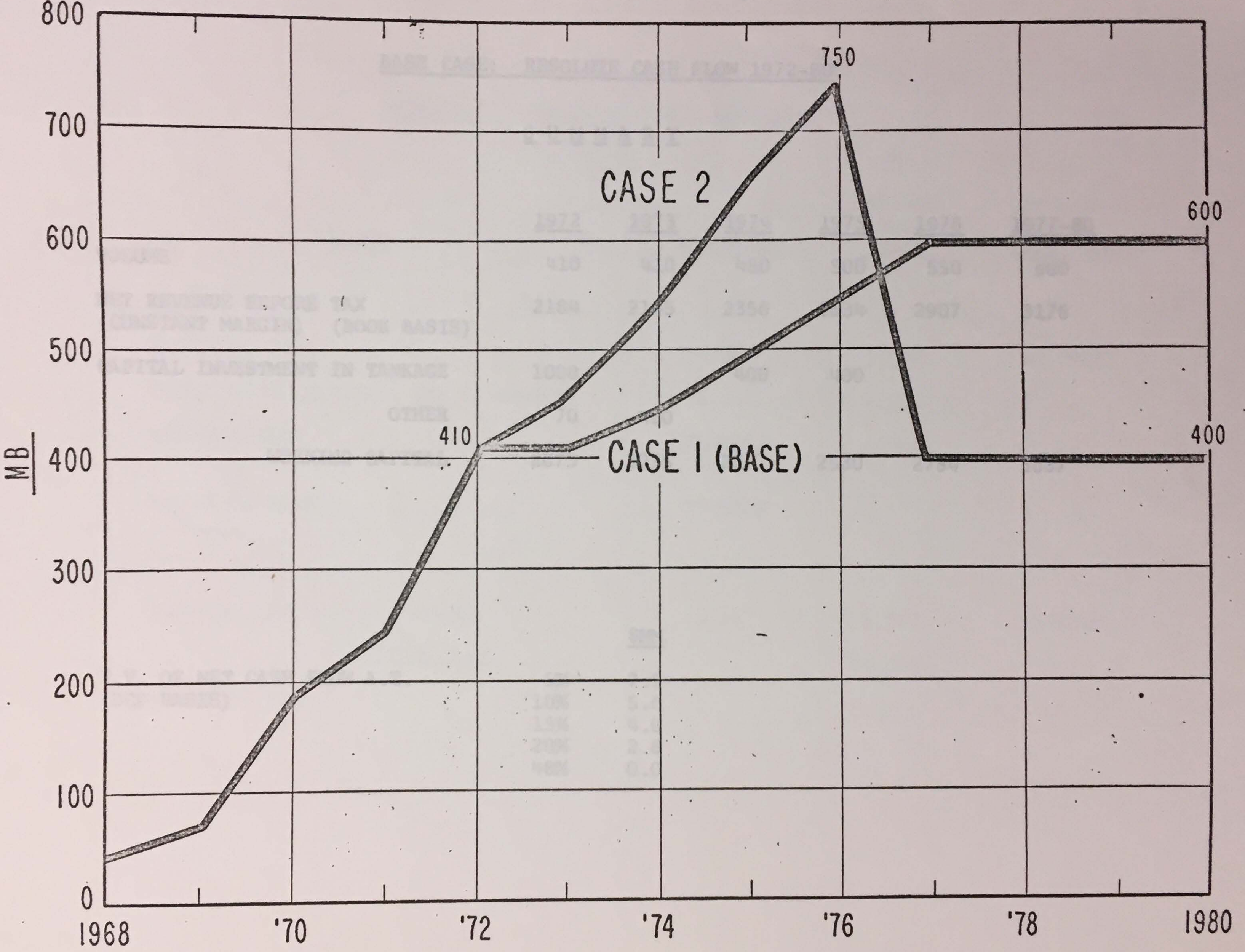
BASE CASE

	1972	1973	1974	1975	1976	1977	1980
RESOLUTE	411	410	450	500	550	600	600
BAFFIN ISLAND	29	64	65	66	67	68	70
MINING (LITTLE CORNWALLIS)	12	13	15	27	30	35	55
DRILLING PROGRAM (PAN ARCTIC, IOL PRODUCING)	201	226	250	275	300	325	325
TOTAL	653	713	780	868	947	1028	1050

MAR/73

7

RESOLUTE FORECASTED VOLUMES (MB)



BASE CASE: RESOLUTE CASH FLOW 1972-80

S U M M A R Y

	1972	1973	1974	1975	1976	1977-80
VOLUME	410	410	450	500	550	600
NET REVENUE BEFORE TAX (CONSTANT MARGIN) (BOOK BASIS)	2184	2145	2356	2634	2907	3176
CAPITAL INVESTMENT IN TANKAGE	1000		400	400		
OTHER	70	450				
WORKING CAPITAL	2075	2075	2277	2530	2784	3037

		$MM
P.V. OF NET CASH FLOW A.T. (DCF BASIS)	5%	7.9
	10%	5.6
	15%	4.0
	20%	2.8
	48%	0.0

IMPERIAL'S RISK IN RESOLUTE BUSINESS

EVENT	INSURANCE	$M MAXIMUM IOL RISK	COVERED IN CASH FLOW
MARINE			
DAMAGE TO HULL	C.I.	1,000	80/TRIP
THIRD PARTY LIABILITY (EX POLLUTION)	C.I.	1,000	--
MARINE SPILLS	TOVALOP ITIA	4,000	--
POTENTIAL FINE	TOVALOP		--
LAND			
TERMINAL SPILL -- ACCIDENTAL	C.I.	1,000	50/YEAR
-- INTENTIONAL		24,000	--
POTENTIAL FINE		5	--

HIGH EASTERN ARCTIC

CASH FLOW COMPARISONS

D.C.F. BASIS - $MM

		BASE CASE	ALT. CASE #2
DISCOUNT RATE	5%	7.9	7.1
	10%	5.6	5.1
	20%	2.9	2.5
DCF RETURN		48%	43%

EASTERN ARCTIC ISLANDS STUDY

C O N C L U S I O N S

- FORECAST SLOWDOWN IN GROWTH RATE
- ACCURACY OF DEMAND FORECAST UNCERTAIN
- BUSINESS IS PROFITABLE
- NO COMMITMENT REQUIRED AT THIS TIME FOR ADDITIONAL ICE STRENGTHENED TONNAGE

ARCTIC STUDY

ALLOCATION OF MARGIN

RESOLUTE BUSINESS

	$/B	
MARGIN	5.23	
LOGISTICS	.45	ACTUAL ON OTHER ARCTIC BUSINESS FOB MTL.
TRANSPORTATION	1.40	4¢/IG BETWEEN CHARTER MARKET AND BEDFORD COST
MARKETING	3.38	20% BOOK RETURN AFTER TAX ON FACILITIES CAPITAL PLUS WORKING CAPITAL

RESOLUTE: 1972 Volumes by Product

AV Gas	.5 MMG - 14.2 MB	Diesel:	3.4 MMG - 97.1 MB
MO Gas	.15 MMG - 4.3 MB	Turbo:	5.4 MMG - 154.3 MB
Stove	.45 MMG - 12.9 MB		

1972 Tankage Built by Imperial

2 - 30 MB	2 - 10 MB
1 - 20 MB	1 - 5 MB

Approximately 80% of Resolute demand in support of Gas and Oil exploration.

Principle customers supplied ex Resolute are:

i.	Pan Arctic	v.	Dome Petroleum
ii.	Pacific Western Airways	vi.	Nordair
iii.	Sun Oil	vii.	Transair
iv.	Government	viii.	Kenting Aviation

Exploration and Producing Companies on Ellesmere Island/ Axel Heiburg:

i.	Pan Arctic	20.0 MB
ii.	Drill Arctic	23.8 MB
iii.	Kenting	2.1 MB
iv.	Imperial Producing	42.0 MB

Plus small N.W.T. and M.O.T. government volumes: 5.1 MB

TOTAL 93.0 MB

FILE - TAGLU PLANT LIQUIDS

Minister
Indian and Northern Affairs

Ministre
Affaires indiennes et du Nord

December 15, 1975

RECEIVED
DEC 1? 1975
J. A. ARMSTRONG

DKM - info
DDL
please handle

Mr. J.A. Armstrong,
President and Chief Executive Officer,
Imperial Oil Limited,
111 St. Clair Ave., W.,
TORONTO, Ontario
M5W 1K3

Dear Mr. Armstrong:

As you are aware, one of the goals of this Department is to ensure that the communities of the Mackenzie River region benefit in a tangible way from the development of Delta gas reserves. The decision on the terms and conditions to be applied if approval is granted for the proposed Mackenzie Delta gas plants will be made in the light of this objective.

One aspect of the development which I feel must be considered is the desirability of installing fractionating facilities in the plants to produce liquid petroleum products. Since such products could provide an additional source of energy supply, an assessment should be made to determine the role that these products could play as an alternate or complementary source of energy in the region. If an assessment of the future energy supply/demand situation in the Mackenzie River region indicates that these liquids would provide an economic source of supply, then production of the liquids would be required. That is, the installation of the fractionating or topping facilities in the proposed plants may be one of the conditions of approval of the overall project.

My officials are proposing a study to assess the potential use of petroleum products from the proposed plants which I feel will be beneficial both to industry and to the Federal Government. I invite your co-operation and assistance in completing this study in order to ensure that northern residents receive the maximum possible benefit from construction of the gas plants. If agreeable to you, my staff will contact your technical personnel directly for more detailed discussion on participation in the study.

Yours sincerely,

Judd Buchanan

Judd Buchanan.

MACKENZIE DELTA

CRUDE TOPPING PLANT

Initiated in May 1970 after discovery of Atkinson.

Screening study completed March, 1972. Reviewed with DINA officials May 29, 1972.

Location	- Tuktoyaktuk
Startup	- 1976
Crude Source	- Mayogiak
Volumes	- 10 MBD crude
	- 4 MBD products
	- 6 MBD reinjected
Markets	- Exploration/development in Mackenzie Delta. 300 MB diesel plus 80 MB turbo yearly.
	- Pipeline construction, local demand Inuvik/Fort McPherson.
Investment	- $20 MM ($8 MM for plant - 1976 dollars)
Operating Costs	- $1.8 MM/year
Economics	- 12% DCF return for product prices <u>then</u> estimated to be competitive with Edmonton ($13/B in 1976).
Risks	- Crude source uncertain, development costs could be much greater.
Conclusion	- Topping plant is not the answer to cheap products for local residents.

MACKENZIE DELTA

CONDENSATE TOPPING PLANT

Another review of topping plant, this time utilizing Taglu condensate as feedstock was completed in mid-1974.

Location	- Richard's Island.
Startup	- 1978
Crude Source	- Taglu condensate
Volumes	- 20 MBD condensate - 600 MB/year product
Markets	- 600 MB/year diesel plus turbo
Investment	- $45 MM ($32 MM for plant - $13 MM for transportation system - 1977 dollars). - High investment results from cost to remove aromatics from condensate.
Economics	- 15% DCF return for product price of $40/B in 1978. - Edmonton product estimated at $30/B in 1978.
Sensitivity	- 1200 MB/year demand case would yield only 6% DCF return at $30/B product price.
Risks	- Process to remove aromatics untested in Northern environments.
Conclusion	- Topping plant on Taglu condensate stream uneconomic.

MACKENZIE DELTA
PROPANE RECOVERY

Review of fractionation of Taglu liquids for propane initiated December 1975. Study almost completed. Will be documented by January 31, 1976.

Location	- Taglu
Startup	- 1982
Volume	- 300 BD propane
Market	- Mackenzie Valley communities ex. Inuvik (propane could not compete with natural gas in Inuvik - separate evaluation).
Investment	- $8 MM for fractionation facilities
Economics	- 6% DCF return to producer (-$2 MM p.v. profit at 15%) based on laid down prices competitive with fuel oil from Norman Wells. (Distribution costs not included.)
	- Product cost to consumer estimated to be twice cost of fuel oil.
	- Propane distribution system costs much more expensive than fuel oil system (pressurized system required).
Sensitivities	- Other products for heating market would require aromatic removal (topping plant).
Conclusions	- Propane recovery from Taglu gas process is uneconomic.
	- Propane recovered from this process would not be competitive with fuel oil in the Mackenzie Valley energy market.

Arctic Review Comm file

M E M O R A N D U M

MARKETING DEPARTMENT

December 15, 1975

Eastern Arctic Meeting
Dec. 4, 1975
Montreal

RECEIVED
DEC 16 1975
G. N. JENKINS

Messrs. F. H. Griffiths - York Mills
R. St. Jean - Montreal
G. Lesage - Montreal
J. Richard - Montreal
P. I. Johnson - Montreal

Pursuant to the minutes of the Eastern Arctic Meeting, attached is a memorandum from B. G. Rosser which goes into more detail on the resolution of the 1975 problem areas.

R. F. Roblin
Product Advisor

RFR:sl

cc: G. N. Jenkins
J. M. Bedard
H. F. Yeomans
A. Lefebvre - Montreal
C. E. Langston - Ottawa
B. G. Rosser - Edmonton

M E M O R A N D U M

MARKETING DEPARTMENT

December 9, 1975

Eastern Arctic Meeting
December 4, 1975

Mr. R. Roblin
Industrial Advisor
TORONTO

At the Eastern Arctic meeting in Montreal, we discussed a number of problem areas and the following is my understanding of the current status.

1. Sarnia Shipments

Shipments of 5 gallon containers during the 1976 resupply are to be handled in a method other than T/C to ensure arrival at the Montreal Docks in satisfactory condition (ie: truck load).

The question of "fibre" quart containers in the Arctic was to be examined further to see what alternatives were available to this container. As we noted, the current package seems inadequate for this usage, but improved shipping techniques on our part might help (ie truck load lots).

The reasons for 1975 resupply delays were not adequately explained and we assume that someone will be investigating the serious delays in Sarnia shipments arriving at the docks.

2. Montreal Shipments

As we understand it, changes in the procedures for handling drum orders in 1976 are in the mill. We were to be advised as to the procedures we are to follow in placing our orders, and Distribution were to advise us of the methods of handling such orders to avoid the 1975 problems of co-ordination of deliveries to the docks.

As we understand the situation, Western Marketing is to obtain the Esso Rad order for Panarctic Oils as quickly as possible, forwarding this to Montreal. Quebec Region will then allocate the packages as required and ensure this stock is reserved for the customer, and is available for shipping. There is a lot of room for problems on this item, and we would like assurance that supply will, in fact, be available in 1976 in the package sizes requested.

We would appreciate being advised at an early date as to who will be the contact for our clients representative in Montreal. One of their complaints was the difficulty in finding an individual,or position,with whom they could make contact to discuss orders and any problems as they come up.

Unless otherwise advised, we will continue forwarding our orders through Montreal Office Sales (Stan Cross) and will also contact Mr. Cross for price quotations.

3. Quebec Comptrollers

Unless otherwise advised, we will assume our prime contact to be Robert St. Jean for any problems that arise. Please ensure that we are advised of any change in this area.

All invoices pertaining to shipments to the N.W.T. (which are eventually transferred to Prairie Region) shall be monitored manually and checked for possible pricing errors. One copy of these invoices should be forwarded to my attention so that we can establish a reference file in Edmonton to handle inquiries.

All Government of the Northwest Territories invoices must have P.O. reference numbers and the invoices are to be sent to:

Government of the Northwest Territories
Supply Services
P.O. Box 70
YELLOWKNIFE, N.W.T.

It is our understanding that this system is now currently in place.

4. General

It was our understanding at this meeting, that due to the delicate nature of these resupply sales, a "fail-safe" check system will be established by Quebec Region to ensure smooth handling of the 1976 resupply. We were to be kept informed as to the methods to be used.

5. Resolute Penalties

Although we neglected to discuss this in depth, we feel a review should be made in January of each year and a formal underlift penalty plan be established to ensure continuity between trade groups and to have the actual penalty based on realistic cost evaluations for the ensuing resupply and closed season. The current system has evolved somewhat loosely and we may be open to criticism if we do not formalize and document it more carefully.

B. G. ROSSER
Sr. Accounts Executive (NWT)

BGR/cm

PROPRIETARY

RECEIVED
DEC 23 1975
G. N. JENKINS

ARCTIC REVIEW COMMITTEE

MINUTES OF MEETING OF DECEMBER 17, 1975

Members Present

G. N. Jenkins, Chairman
K. W. Briggs (for G. H. Thomson)
C. E. Overturf
R. G. Wilson

Guests

R. Horsfield
N. S. J. Bloomer

Mr. Horsfield, Corporate Manager for the Arctic, and Mr. Bloomer, Western Coordinator - Employee Relations Department, Prairie Region, presented the Northern Native Employment Study to the Arctic Review Committee on the above date.

The study reviews the progress made to date and outlines plans for expanding native training and employment in the future. Present regular native northerner employment is 33. A total of 123 training positions are identified in 1981. It is believed that the program is in full compliance with Federal Government guidelines.

Since the functions involved have previously been given the opportunity to review the study, the complete report has not been attached to the minutes. However, copies of the study can be obtained through Mr. Bloomer's office. A copy is also available for review in the files of the Arctic Review Committee.

R. F. ROBLIN
SECRETARY

December 22, 1975

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cc: Messrs.

G. N. Jenkins ✓	G. A. Fullerton	G. R. McLellan
C. E. Overturf	G. L. Haight	D. M. Penrose
R. O. Pfister	P. G. Hall	V. Sirois
G. H. Thomson	R. Horsfield	J. C. Underhill
R. G. Wilson	H. G. Jarvis	W. A. West
N.S.J. Bloomer	C. E. Langston	G. K. Whynot
G. W. Carter	P. J. Levins	R. A. Wilson

IMPERIAL OIL LIMITED

MARKETING DEPARTMENT

Vice President & General Manager
WILLIAM A. WEST

Assistant General Managers
CHARLES A. HAYLES
GEORGE N. JENKINS
GEORGE R. WISENER

111 St. Clair Avenue West, Toronto, Canada M5W 1K3

RECEIVED
DEC 23 1975
G. N. JENKINS

December 22, 1975

Arctic Review Committee

Messrs. G. N. Jenkins
C. E. Overturf
R. O. Pfister
G. H. Thomson
R. G. Wilson

N.S.J. Bloomer
G. W. Carter
G. A. Fullerton
G. L. Haight
P. G. Hall

R. Horsfield
H. G. Jarvis
C. E. Langston
P. J. Levins
G. R. McLellan
D. M. Penrose
V. Sirois
J. C. Underhill
W. A. West
G. K. Whynot
R. A. Wilson

Dear Sirs:

Attached, for your information, is a copy of the recently completed Northwest Territories Gas Study furnished to the Arctic Review Committee by Gord Clarke of C&LHS Department. Since C&LHS has already reviewed this study with the functions directly involved, our Committee does not plan a formal review of the study.

Yours very truly,

R. F. Roblin/sb

RFR/sb
Attach.

R. F. Roblin
Secretary

PROPRIETARY

NORTHWEST TERRITORIES GAS STUDY

Introduction:- This report reviews the market potential for natural gas in the western Northwest Territories, the possible distributors of gas in the area and proposes a policy for Imperial Oil to adopt with respect to selling gas for N.W.T. consumption. Although a review of this nature has been part of C&LHS objectives for some time, commencement of the N.E.B. Mackenzie Valley Pipeline Hearings and Imperial's planned appearance at the Berger inquiry make establishment of a policy at this time desirable. Furthermore Foothills Pipe Lines recently requested that Imperial sell to Foothills about 20 MM CF/D of gas which would then be delivered to N.W.T. communities and resold to local distributors. The recommended policy, if adopted, would form the basis of responses to questions at the N.E.B. and Berger hearings and to Foothills.

Although Imperial is the major petroleum based energy supplier in the N.W.T. and will therefore stand to lose sales if natural gas is distributed, it is a key assumption of this report that natural gas will be distributed to communities in the N.W.T. to a degree and at a cost acceptable to the residents and Government of the N.W.T. This report does not review in depth the implications of the sales loss upon Imperial nor suggest any market strategy for marketing existing products.

Conclusions & Recommendations

- The market is small and widely distributed.
- Distribution of gas will be expensive as laterals are generally long and throughput is low.
- Total capital and operating costs will establish a cost of gas which is extremely competitive with existing fuels in Inuvik but less competitive to more expensive in smaller communities and large southern communities.
- Inuvik because of its proximity to the gas plants, relatively large population and remoteness from alternative fuels could be supplied with gas at the lowest cost. Savings relative to alternate fuels would be substantial.
- Six communities adjacent to the Mackenzie River could be served with gas at a lower cost than alternate fuels.

. Pricing gas on an average system cost basis would increase the number of communities to eight which could be served at a lower cost than alternative fuels.

. Gas would be more expensive than alternative fuels in the southern communities around Great Slave Lake.

. Tuktoyaktuk, the major native community (95% Inuit) is not economic relative to liquid fuels. ($39.50/MCF for gas vs. $6.65/MCF equivalent for fuel oil delivered from southern refineries).

. The type of saving to be realized will not be consistent with the expectations for extremely low cost fuel supplies.

. Government subsidization of distribution costs will be required to allow gas to be distributed at a price substantially less than existing fuels.

. Such subsidization will result in a high degree of government control over the distributor.

. This type of market will not attract private industry.

. No opportunity exists for Imperial Oil to market gas. Penetration of gas will result in loss of existing product sales in the area which will negatively affect income.

. It is recommended that Imperial's policy be that Imperial will enter into negotiations to sell gas to any group which can demonstrate that it has a franchise to distribute gas in the N.W.T. No position should be adopted at this time as to the terms and conditions such a contract would contain.

. A reply be made to Foothills declining to negotiate with them but identifying that we will negotiate with the distributor who has the franchise.

a) <u>The Market</u>

i) <u>General</u>

Natural gas is expected to compete with existing energy sources in the residential, commercial, and industrial market sectors and in the thermal generation of electricity and/or heat.

The market area where natural gas is expected to present competition to existing fuels is in the western Northwest Territories in the Mackenzie Valley and Great Slave Lake Areas.

The following market characteristics are relevant:

. The area studied contains 18 communities with an estimated population of about 23,000 (1973). CAGPL projects the population to be 32,000 by 1979 and 37,000 by 1982. This increase results from natural resource development and construction of the natural gas pipeline. (See Table I)

. The major market segments are concentrated either at the extreme north end of the Mackenzie Valley or in the Great Slave Lake area (approximately 600 miles apart). (See map attached)

. Imperial has a long history of involvement in the area and is currently the major supplier of fuel. Products are supplied from Norman Wells refinery supplemented by Edmonton products delivered to Hay River by rail and barged to communities. Shifts to natural gas will cause existing business to decline and may make remaining services more expensive.

. In general, the communities have small populations and housing is widely spaced relative to southern communities.

. The economy of the area is related principally to natural resource development, hunting and fishing and the associated secondary industry. Military and Government functions are also major factors in the economy.

ii) Other Market Factors

. The population is largely composed of native peoples, ie. Inuit and Indian. They claim ownership of the land and resources and wish to determine the degree and manner in which the resources are developed. The expectations of the native groups are high and are not likely to be satisfied.

. Due to the poor intrinsic economy of the area and the large native population, residents receive substantial subsidization and are attuned to this type of support.

. The native population is somewhat alienated towards southern Canada residents, and the Federal government. It is generally felt that southerners intend to exploit this area without reasonable and fair compensation to northerners. As development commences, many feel this alienation will increase due to an influx of southern residents and the inflationary pressures which may be created by a project of this magnitude.

iii) Studies of Market

A report prepared for CAGSL by Associated Engineering Services Limited, Northern Engineering Services Company Limited, and Gemini North Ltd., entitled "Impact of Proposed Arctic Gas Pipeline on Energy Costs in Northern Communities" was used as the source document for this report with minor modifications. A summary of

that report is attached. The key points of the CAGSL report are: (see Table I and II for details)

	Mackenzie Valley Communities	Yellowknife and Hay River Area Communities
Population (1979)	13,300	18,700
Gas Needs		
Annual	1,286 MMCF/yr.	1,245 MMCF/yr.
Daily Average	3.5 MMCF/D	3.4 MMCF/D
Peak Day	9.3 MMCF/D	10.5 MMCF/D
Capital Cost of a gas distribution system including laterals.	$10.3 MM	$34.2 MM
Capital $/Person	775	1,825

The demands are based upon 50% penetration of the space heating market and 100% of the thermal electric generation market. These numbers may be optimistic as conversion costs, which the consumer would have to bear, are not included in the proposal.

The report considered two methods to allocate costs to consumers: i) a community basis or ii) an overall system basis.

Two costs were tested for purchased gas i) 32¢/MCF and ii) $1.00/MCF at the plant gate. This was compared to a "most likely" fuel oil cost of 85¢/IG plus transportation from Norman Wells. (The fuel oil cost was based upon crude oil being priced at $20/B in Norman Wells in 1979. This compares with the current fuel oil cost of 30 ¢/IG at Norman Wells.)

Cost of Gas to Consumers*

Mackenzie Valley	Community Basis	Overall Basis	Overall Including Yellowknife Lateral**	Estimated Equivalent Fuel Oil Cost @ 85¢/IG	65¢/IG
	$/MCF	$/MCF	$/MCF	$/MCF	$/MCF
Inuvik	1.55	2.50	5.65	6.40	5.05
Norman Wells	2.70	2.50	5.65	5.65	4.35
Fort McPherson	4.40	2.50	5.65	6.25	4.95
Fort Good Hope	4.65	2.50	5.65	6.00	4.65
Fort Simpson	5.10	2.50	5.65	6.10	4.75
Aklavik	6.55	2.50	5.65	6.40	5.05
Fort Norman	7.05	2.50	5.65	6.00	4.65
Wrigley	8.95	2.50	5.65	6.25	4.95
Yellowknife Lateral					
Yellowknife	10.85	8.85	5.65	6.20	
Hay River	5.80	8.85	5.65	5.65	

*Only $1.00/Mcf case for gas purchase price is shown. Subtract 68¢/Mcf to show costs for 32¢/Mcf case.
**Not included in CAGPL study. Derived from CAGPL Data.

On these bases, the Yellowknife lateral was rejected as more costly than fuel oil. Natural gas service would be less costly only for five Mackenzie Valley communities on a community costing basis and eight on an overall system basis. The communities in which fuel costs are reduced are Inuvik, Fort Simpson, Fort McPherson, Norman Wells and Fort Good Hope plus on an overall basis, Aklavik, Fort Norman and Wrigley.

b) Natural Gas Distributor Alternatives

In determining who might undertake the responsibility for handling distribution, the following groups were reviewed:

i) Canadian Arctic Gas Pipeline Limited (CAGPL)

- CAGPL's policy on supplying gas to the N.W.T. is to "cooperate fully with any entity which desires to consider or has decided to carry on the purchase of gas and the construction of gas distribution facilities in the various communities. Such entities may include private companies (now in existence or to be formed) or governmental agencies." Arctic gas would transport gas purchased by such entities and would consider constructing and operating on their behalf laterals to connect their distribution facilities with CAGPL.

- A higher level of involvement is unlikely due to the political unacceptability to American participants in CAGPL of subsidization of Canadian consumers. Only direction by the Canadian Government could change this position.

- Under commodity pricing, any subsidies granted by CAGPL will reduce the producer's netback.

ii) Foothills:-

- Foothills has announced that it will include laterals to service the N.W.T. in its basic pipeline system and roll the cost into its tariff. Gas will be purchased and sold to community distributors at cost plus the same transportation cost as Foothills will charge for delivery of gas into AGTL at the N.W.T./Alberta border. This will raise the tariff on gas going to southern customers from 50¢/MCF to 51.5¢/MCF.

- Foothills states southern Canadian consumers will therefore be subsidizing northerners but in fact under commodity pricing, the producer will pay.

- Inuvik would have higher gas costs as the tariff Foothills proposes is considerably higher than the CAGSL study suggested.

- Foothills estimates an annual saving of $500/customer but no details have been revealed. Foothills estimates an additional capital cost of $72MM to build the laterals.

iii) Northern Canada Power Commission (N.C.P.C.)

. NCPC is a Federal crown corporation which distributes public utilities in the N.W.T., Yukon and other places as recommended by the government. It currently distributes electricity in 54 communities in the N.W.T., Yukon, B.C. and Ontario. Although primarily an electrical distributor, NCPC also does distribute heat and water and processes sewage in a few communities. NCPC reports to Parliament through the Minister of Indian Affairs and Northern Development (DIAND).

. NCPC's authorizing act requires that projects undertaken are to be self sustaining; ie. operations, maintenance, administration, interest, principal repayment and contingency reserves must be recovered. No provision is made for subsidization of service.

. NCPC are currently investigating distribution of natural gas in the N.W.T. NCPC have not approached Imperial for a gas supply. It is believed NCPC view themselves as the logical distributor of gas.

. Although NCPC may expect to establish gas distribution services, public reaction is expected to be negative as NCPC is generally unpopular in the area. DIAND on the other hand can be expected to support NCPC. In NCPC, the government has an operating entity which knows the market and would not require a profit.

iv) Public Utilities, Pipelines or Producers

. Privately owned companies are not expected to find the N.W.T. gas market attractive due to the extremely small market and high projected distribution costs combined with the potential dissatisfaction of Northerners if a low cost energy source is not obtained. Government subsidies will be required to make the economics favourable. Future growth does not appear to be a sufficient inducement to industry.

. No opportunity is seen for such companies to develop this market.

v) Government of N.W.T. (GNWT)

. The Government of the N.W.T. currently distributes fuel in numerous communities too small to support a privately run agency including many of the communities which expect to receive natural gas.

. The GNWT exercises jurisdiction over all Government activities in the N.W.T. with the exception of natural resources. Gas distribution would be within their jurisdiction; however, use of royalties to subsidize gas distribution would not be feasible unless changes in legislation were to occur. GNWT may therefore use pipeline and other taxation as the bases to subsidize the cost unless DIAND takes positive action. Such a program would

be consistent with the rural gasification program in Alberta and the programs of rural electrification in numerous provinces.

vi) Community Groups

. The CAGSL report indicates that the cost of natural gas will be lower than competitive fuels in six communities (Table II). Inuvik because of both its large size, proximity to the field and distance from alternate fuels would have the lowest cost gas. Inuvik's council is aware of this situation and has passed a by-law to retain the distribution franchise at a civic level although its jurisdiction is questionable. Strong opposition to Inuvik proceeding alone is expected from the Government of the N.W.T. and the Government of Canada (DIAND, NCPC). If Inuvik were to proceed alone, it is unlikely that the over all system basis would be viable. Nearby Tuktoyaktuk (80 miles) would be particularly concerned by the wide variance in costs. ($39.50/Mcf vs. $1.55/Mcf)

. This type of servicing with the exception of Inuvik is not considered feasible unless subsidized.

Other Fuels

a) Fuels Currently Used in the Area

Norman Wells and Edmonton are the current supply points for petroleum products into the N.W.T. Penetration of gas into the heating market would first eliminate Edmonton product and then reduce Norman Wells crude running. Logistics reviewed the effect of loss of the majority of the thermal electric market and of gas obtaining a high penetration of the heating market in the communities. They concluded that Norman Wells refinery would experience a large amount of flaring of heavy fuel oil if other product demands were to be met. Competitive action to maintain markets would be required or serious consideration would have to be given to shutting down the refinery. The effects of a shutdown have not been assessed.

A study was made in 1974 of a topping plant to produce specification diesel and turbo fuel to be built on Richards Island. Due to the poor economics shown at that time, this study was not updated.

b) LPG or Stabilized Condensate

. Producing department are currently reviewing the economics of LPG distribution in the northern section of the Mackenzie Valley. Such a proposal might include liquid recovery and stabilization at Richards Island, pipelining or seasonally storing and barging to Tuktoyaktuk, Aklavik and Inuvik followed by road distribution to Arctic Red River and Fort McPherson and potentially into the Yukon. Distribution to the southern market areas is not viable.

. In the Inuvik market area, LPG would be an attractive fuel as it would not require the major distribution system that gas requires,

is clean burning and could satisfy transportation needs as well. However if extracted from natural gas, it would reduce the revenue available from such sales unless priced on BTU equivalence basis. If propane were required to be extracted to meet the Arctic pipeline dew point specifications, a lower cost might be reasonable rather than re-injection.

. Stabilized condensate would be a desirable fuel for thermal generation but would not likely be suitable for space heating. Although it could be priced reasonably relative to re-injection, no substantial market is foreseen as gas would still be installed to meet space heating needs.

G. G. Clarke

G. G. Clarke

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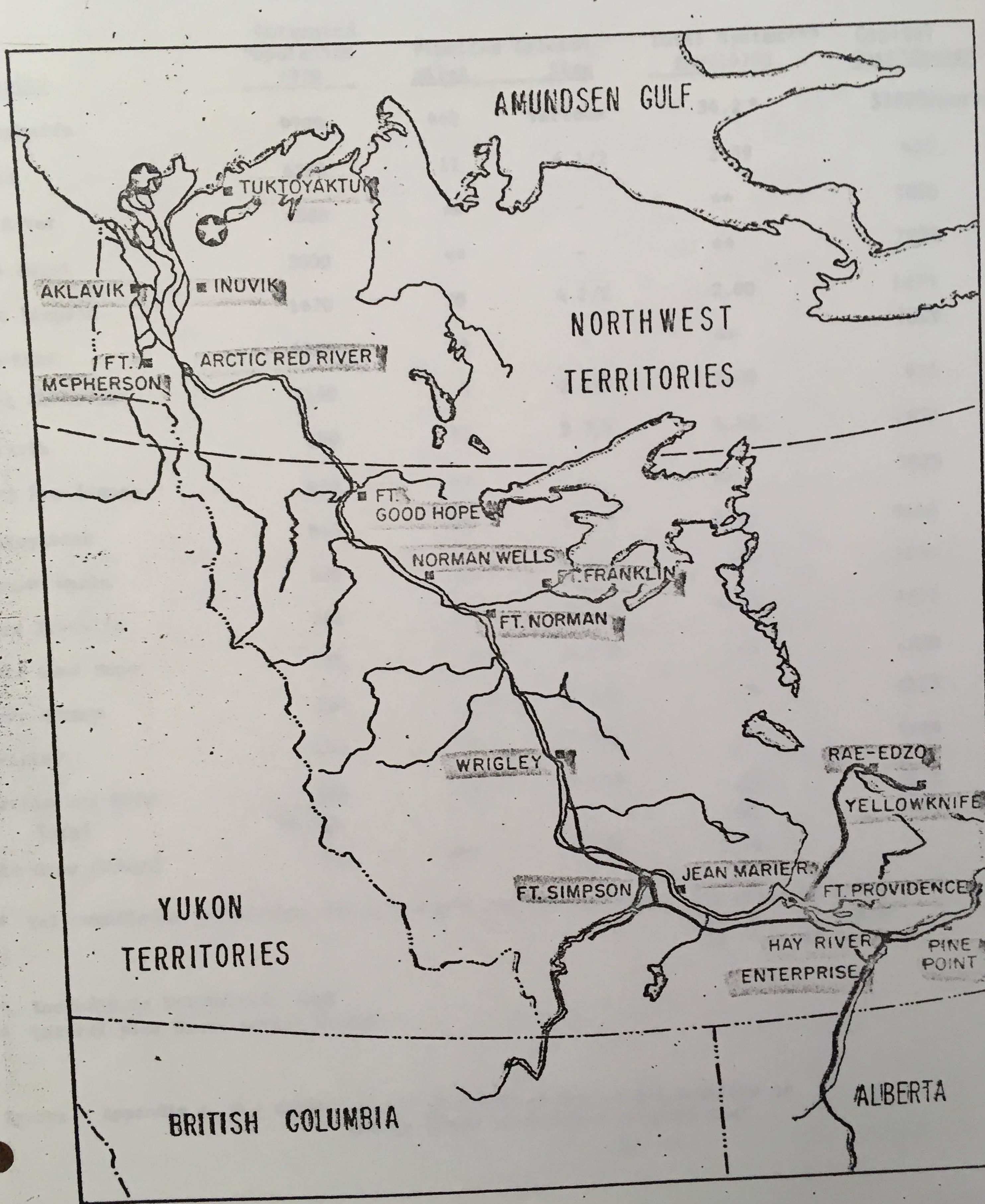
Attachments



AMUNDSEN GULF
TUKTOYAKTUK
AKLAVIK
INUVIK
FT. McPHERSON
ARCTIC RED RIVER
NORTHWEST TERRITORIES
FT. GOOD HOPE
NORMAN WELLS
FT. FRANKLIN
FT. NORMAN
WRIGLEY
RAE-EDZO
YELLOWKNIFE
JEAN MARIE R.
FT. SIMPSON
FT. PROVIDENCE
HAY RIVER
PINE POINT
ENTERPRISE
YUKON TERRITORIES
ALBERTA
BRITISH COLUMBIA

TABLE I

N.W.T. GAS STUDY

PROPOSED PIPELINE LATERALS AND COSTS

Community	Estimated Population 1979	Pipeline Lateral Miles	Pipeline Lateral Size	Total System*** $MM(1979)	Capital Cost/Person
Yellowknife	9700	460	Various	34.2 *	$1825/person
Inuvik	6250	11	4 1/2	2.59	415
Hay River	4580	**	-	**	1825
Pine Point	2000	**	-	**	1825
Fort Simpson	1670	20	4 1/2	2.80	1675
Rae-Edzo	1580	**	-	**	1825
Fort McPherson	1140	5	2 3/8	1.09	955
Aklavik	890	12	2 3/8	1.63	1830
Fort Providence	870	**	-	**	1825
Tuktoyaktuk	840	88	4 1/2	7.23	8610
Norman Wells	730	2.4	2 3/8	.76	1040
Fort Franklin	580	67	2 3/8	4.82	8310
Fort Good Hope	500	2.5	2 3/8	.61	1220
Fort Norman	350	4.3	2 3/8	.74	2115
Wrigley	240	2	2 3/8	.47	1960
Arctic Red River	120	8.4	2 3/8	.62	5170
Total	32,040			58	1800
Old Crow (Yukon)	290	108	2 3/8	7.22	

* Yellowknife/Hay River/Pine Point/Rae-Edzo Lateral Includes: 295 miles of 8 5/8"
126 " of 6 5/8"
37 " of smaller.

** Included in Yellowknife data

*** Lateral plus Distribution System

Source - Appendix A, D - CAGSL "Impact of Proposed Arctic Gas Pipeline on Energy Costs in Northern Communities"

TABLE II

N.W.T. GAS STUDY

GAS USAGE & ESTIMATED TARIFFS

mmunity	Estimated Population 1979	Estimated Population 1982*	Estimated Gas Use MMcf/yr	1979 Peak Day MMcf/D	CAGSL Estimated Cost of Gas (Wellhead at $1.00/Mcf) Community Basis ($/Mcf)	CAGSL Estimated Cost of Gas (Wellhead at $1.00/Mcf) System Basis	Estimate Equivalent Fuel Oil ¢/Mcf
ellowknife	9700	11320	560	4840	10.85	8.85	6.20
nuvik	6250	7040	885	6310	1.55	2.50	6.40
ay River	4580	5570	500	4010	5.80	8.85	5.65
ine Point	2000	2170	140	1290	11.15	8.85	5.65
ort Simpson	1670	1730	145	1127	5.10	2.50	6.10
Rae-Edzo	1580	1660	45	360	15.55	8.85	6.20
Fort McPherson	1140	1380	60	410	4.40	2.50	6.25
Akl ik	890	1000	50	340	6.55	2.50	6.40
Fort Providence	870	1050	45	350	5.85	8.85	6.00
Tuktoyaktuk	840	980	30	N/A	39.50	Not included	6.65
Norman Wells	730	840	90	700	2.70	2.50	5.65
Fort Franklin	580	760	35	N/A	26.00	Not included	6.65
Fort Good Hope	500	570	30	210	4.65	2.50	6.00
Fort Norman	350	400	20	160	7.05	2.50	6.00
Wrigley	240	280	10	80	8.95	2.50	6.75
Arctic Red River	120	140	10	N/A	14.10	Not included	6.20
	32040	36890	2655	20190			
Old Crow (Yukon)	290		20		60.00	Not included	

Source - CAGSL "Impact of Proposed Arctic Gas Pipeline on Energy costs - Northern Communities"

*Escalated on growth rate projection for each community

SUMMARY OF CAGSL REPORT entitled

"Impact of Proposed Arctic Gas Pipeline on Energy Costs in Northern Communities" September 1974.

- Considered supply of gas to 25 NWT & Yukon communities. As well as supply to Mackenzie Valley communities, these included communities to be served by the following laterals:

  a) Yellowknife and south shore of Greater Slave Lake
  b) to Whitehorse through Macmillan Pass
  c) to Fort Franklin on Great Bear Lake
  d) to Old Crow

- Two bases were used to develop cost comparisons for Mackenzie Valley communities

  a) Individual community pricing
  b) Overall system pricing for a group of communities which passed preliminary screening

  Similar comparison were carried out for communities to be serviced by laterals, however the overall system pricing did not include these laterals.

- Startup of CAGSL was assumed in 1979. Costs and population were escalated to a 1979 bases.

- Two possible well head prices for gas were considered; 32¢/Mcf and $1.00/Mcf.

- The competitive fuel was considered to be fuel oil supplies from Norman Wells or Edmonton. A price of 85¢/IG ±20¢/IG was estimated which is equivalent to $21 crude oil in Edmonton.

- It was assumed that gas obtained 50% of the space heating demand and 100% of the thermal generating load in each community.

- The CAGSL report concluded for the Mackenzie Valley that:

  1) Natural gas priced on a community pricing basis would reduce the cost of fuel to residents of Inuvik, Norman Wells, Fort McPherson, Fort Simpson, Fort Good Hope and Aklavik.

  2) On an overall system basis, the above communities plus Fort Norman and Wrigley would benefit from reduced fuel costs.

  3) The majority of savings occur in Inuvik as it represents 2/3 of the possible demand and is located close to the gas fields.

- For communities to be served by laterals:

  1) Fuel costs would not be reduced in communities served by any of the laterals reviewed.

2) The cost of gas delivered through the Yellowknife - Hay River lateral would be about 1/3 higher than competitive fuels based upon the overall system basis.

3) The cost of gas through the Whitehorse lateral would be double alternative fuel costs.

- This above analysis does not include conversion costs for existing customers. The saving realized by Mackenzie Valley customers considered economic would pay the conversion cost in 1-2 years.

- The report does not:

  a) discuss the change in field prices between 1973 and 1979 - ie 22¢/IG rising to 85¢/IG.

  b) combine the Mackenzie Valley and Yellowknife/Hay River systems. This results in a reduced savings (19% & 8%) respectively and makes the Yellowknife lateral viable.

- CAGSL's stated policy following receipt of this report is that it "stands ready to cooperate fully with any entity which desires to consider or has decided to carry on, the purchase of gas and the construction of gas distribution facilities in the various communities. Such entities may include private companies, (now in existance or to be formed) or governmental agencies." It "would transport gas purchased by such entities to an appropriate offtake point on its pipeline." Furthermore, it would on behalf of distributors, construct and operate laterals should this be economic and desirable.

GGC
OCT. 9/75

TO// G.L. HAIGHT

OTTAWA, Ontario K1A 0H4,
December 23, 1975.

Imperial Oil Limited,
Production Department,
500-6th Avenue S.W.,
CALGARY, Alberta.

Attention: Mr. G. Mainland
Frontier Planning Manager

Dear Sir:

In his letter of December 15, 1975 to Mr. J. Armstrong, the Honourable J. Buchanan indicated that one of the goals of this Department is to ensure that the communities of the Mackenzie River region benefit in a tangible way from the development of Delta gas reserves. To achieve this end, it is anticipated that energy will be supplied to the communities, and other users, either in the form of natural gas, as electricity generated locally or generated at the proposed Delta gas plants and transmitted to communities, or as fuels produced from liquid hydrocarbons removed at the proposed gas plants.

We therefore propose that a study be conducted to assess the potential for using hydrocarbon liquids from the proposed Delta gas plants as a source of energy in the Mackenzie River region. A draft of the terms of reference for such a study is enclosed for your comments. We recommend that a consulting firm be contracted to carry out the study under the direction of the Department of Indian Affairs and Northern Development in co-operation with Imperial Oil Limited, Gulf Oil Canada Limited and Shell Canada Limited. Since such a study may also be of interest to the Northern Canada Power Commission we will contact them to determine if they wish to participate. Attached is a list of Canadian consulting firms which we believe are capable of doing the study. We would appreciate your comments on the capabilities of these firms, as well as the names of any others which you feel would be suitable.

The government will benefit from this study in that it will form the basis for a decision as to whether or not liquid petroleum products from the gas plants would be required and should be produced to meet

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demands in the future or whether the liquid hydrocarbons should be reinjected. That is, the installation of fractionating or topping facilities may thus be one of the conditions of approval of the overall project. On the other hand your company, as well as Gulf Oil Canada Limited and Shell Canada Limited, will benefit from the portion of the study which will deal with the potential markets in the area and alternatives for disposition of the liquid hydrocarbons.

We are suggesting that the costs for the study be borne in equal proportions by Imperial, Gulf, Shell, Government and the NCPC, if they decide to participate.

A successful formulation and completion of the study would additionally require that the companies involved would supply technical data about the proposed fractionation facilities. This would include information on such factors as the composition and volume of natural gas liquids expected at each plant, the potential types and quantities of petroleum products obtainable from the liquid hydrocarbon stream, and a breakdown of the capital and operating costs for the required fractionation facilities as well as possible other data requirements which could arise during the planning and conduct of the study.

Your prompt attention to this matter will be appreciated.

Yours sincerely,

Ewan Cotterill

Ewan Cotterill.

Encl.

The Role of hydrocarbon liquids from Mackenzie Delta gas processing plants in the energy supply for the Mackenzie River region

General

Communities adjacent to the Mackenzie River currently receive most of their petroleum product requirements from the Norman Wells refinery, for areas north of Fort Simpson, and from Edmonton, for areas south of Fort Simpson. Additional supplies are also brought in from the south to meet commercial and industrial requirements e.g. for use in petroleum exploration in the Mackenzie Delta. Electricity requirements are provided either by diesel generating units in individual communities or by small, local hydro developments.

However, construction of a natural gas pipeline from the Delta to southern markets would provide two potential alternate sources of energy. First, natural gas from the pipeline could be provided to communities for direct use in heating and cooking or for the generation of electricity. The second source would be the hydrocarbon liquids which would be produced at gas processing plants at the head of the pipeline in the Mackenzie Delta region. Raw natural gas from the producing fields must be processed at the processing plants to meet pipeline dewpoint requirements before it can be transported in the pipeline. As a result of this processing, hydrocarbon liquids will be produced. The actual volume and composition of the liquids produced at a particular plant varies, depending upon the composition of gas in the producing fields which supply it and the hydrocarbon dewpoint requirements of the Trunk line. The Mackenzie Delta producers initial application indicated that processing of 1.0 Bcf/d of raw gas at the Taglu plant would produce approximately 8,600 b/d of liquids while processing of .5 Bcf/d at the Parson's Lake plant would produce in excess of 7,000 b/d.

Once the liquids have been removed from the raw gas there are a number of options available with regard to their disposition. One option would be to use a portion of the liquids as plant fuel for the plant and reinject the balance into the original producing horizon for possible recovery at some future date e.g. when a liquid pipeline was completed from the Delta to southern markets. A second option would be to install fractionating facilities at the plants which would process the natural gas liquids to provide a limited range of products such as propane, butane, diesel and aviation fuel. The volumes of these products which could be produced, while not large in absolute terms, probably would be significant in terms of regional supply and demand. It is necessary, therefore, to examine the future energy supply-demand situation in the region to determine whether or not petroleum products from the gas plants would be required and should be produced to meet product demands in the future, or whether the undifferentiated liquids should be re-injected for storage until required at some later date.

Terms of Reference

1) The objective of the study is to ensure that optimum benefits will accrue to northern residents from the production and consumption of natural gas and the liquid petroleum products which could be produced as a by-product of natural gas processing at the proposed Delta plants. More specifically, the study will determine the extent to which petroleum products produced from natural gas liquids at the gas processing plants could be used as an economic source of energy in the Mackenzie Valley region, either by displacing products from other sources or by substituting for other forms of higher priced energy. Results of the study will be used as the basis upon which to decide whether or not the installation of fractionation facilities and the production of petroleum products will be a condition of approval for the applications to construct gas processing plants in the Mackenzie Delta.

2) The consultants should develop a projection of petroleum product demand for the 15 year period following the start of operations of the gas processing plants. The projection should show annual demands for the normal range of products for each of the residential, commercial and industrial sectors. To the greatest extent possible, demand should be broken down on a sector, areal and community basis. Demand for individual communities in the study region should be derived, probably on the basis of extrapolating demand from a limited number of "sample" communities. The assumptions used in developing the demand projection should be consistent with current DIAND thinking on such factors as population growth and the expected pattern of regional development if a pipeline is approved.

3) When demand is established, the consultants should determine the optimum method of meeting the demand with the alternate sources of product supply which may be available at the time such as the Norman Wells refinery, other refineries in the south and products from the gas plants. It is also possible that an oil pipeline may be constructed along the Mackenzie River during the study period. Such a line could also influence product supply in the area by encouraging the construction of crude oil topping plants and possibly also be affecting the disposition and pricing of Norman Wells crude. In assessing the optimum method of meeting the demand full consideration must be given to relative prices and any constraints such as transportation and storage requirements. Where substitution of alternate energy sources is possible e.g. natural gas or electricity for space heating, this must be considered. The analysis must clearly indicate the economic impact of the availability or non-availability of products from the gas processing plants on the product supply-demand balance over the study period.

4) The consultants should provide an analysis of the relative costs and benefits of using the following alternative sources of energy in the communities: natural gas from the pipeline; petroleum products from either the gas plants, crude oil topping plants, Norman Wells or southern refineries; and electricity (either locally generated using one of the product sources listed above, generated at the gas pipeline and transmitted to communities, or hydro). The analysis must be based on normal pricing practices (i.e. taking account of all costs incurred in supplying energy to all energy users in the community). Where conversion from existing sources would be required, the

cost of such conversion should be estimated, together with an estimate of the time required to pay back the costs if savings are anticipated. In addition, a comparative weighing should be made amongst alternatives with respect to relevant factors such as possible disruptions of supply, convenience, household equipment maintenance and safety.

5) The consultants should identify any potentially important socio-economic implications arising from the use of specific energy sources e.g. repercussions in the local labour market resulting from changes in energy transportation patterns, potential secondary employment effects arising from the availability of specific types of energy, etc.

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Factors Implicit in the Study

The following, though not all inclusive gives an indication of some of the variables affecting supply, demand, pricing, and transportation which would have to be considered in the proposed study.

1. Current Supply-Demand Situation

- current sources of supply by product type, quantity, and mode of transportation
- current demands by region, community, quantity and type of product, transportation mode, and use e.g. residential, commercial, industrial (in as much detail as possible).
- pricing methods
- distribution agencies and methods (cooperatives?).

2. Future Energy Supply

a) Norman Wells

- refinery products production forecast
- effects of a Mackenzie Valley oil pipeline on refinery operations

b) Delta Gas Plants

- Taglu, Niglintgak, Parson Lake, what others, where situated
- liquid hydrocarbon production and composition
- alternatives for re-injection or recovery; storage
- potential volume and type of refined products
- plant use forecast; residual liquid hydrocarbons volume and potential uses
- capital and operating cost of facilities; pricing of liquids

c) Natural gas from pipelines

- initial capacity; expansion
- proposed laterals to communities
- pricing to communities e.g. by community, zone pricing, methods proposed by CAGSL, Foothills, use of subsidies.

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d) Mackenzie Valley Oil Pipeline

- timing, capacity, route
- affect on new refinery, topping plant development
- type, volume, price of products from topping plant.

e) Electric Power

- existing facilities; proposed expansions or new developments
- current and future fuel requirements for thermal generation;
- pricing, effects of alternate fuels for thermal generation on price of electricity and development of new capacity.

f) Edmonton Refineries

- volume and distribution of products to northern markets
- product prices
- potential effects on Edmonton refineries due to development of petroleum product production in Delta.

g) Haines - Fairbanks Line

- potential volume, products, price

3. Future Demands

- future demand for residential, commercial, industrial by product
- effects of changing social and economic conditions on historic demand patterns
- opportunities for substitution
- cost-benefits of conversion between alternative energy sources.

4. Transportation - Storage

- existing and proposed transportation facilities; e.g. improved road links between Mackenzie Delta communities, Yukon, etc.
- availability of new or expanded facilities as a result of pipeline - gas plant construction e.g. new barge capacity, fuel terminals, etc.

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- transportation and storage implications resulting from availability of new product sources from Delta gas plants, e.g. possibility of reduced storage requirements for products from southern sources.

8/c

CONSULTANTS

	NAME	SPECIALIZATION	CONSULTANT'S STAF
1)	Canadian ResourceCon Limited 204-200 East Pender St. Vancouver, B.C. V6A 1T7 Tel. (604) 682-8691	Economic Consultants. Specialize in Energy and Water Resources Development Studies Regional Economic Analysis Industrial Feasibility Studies Transportation Economics and Analysis	William R. Lee B. Sc., M.A. Douglas K. Strang B. Sc., M.Sc. G.A. Constable B.A. Sc., M.Sc., Gregory R. Staple B.A. Timothy L. McDaal B.A., M.A.
2)	Sorès Inc. 1550 de Maisonneuve Blvd. West Montreal 107, P.Q. Tel. (514) 931-3551	Specialize in the application of the latest techniques of economic, physical and social evaluation, including operations research and econometrics, to the planning process.	A. Anctil, Presid P. O'Byrne P. Tordon M. Kremer L. Oswald
3)	Underwood, McLellan & Associates Ltd. 11831-123rd St. Edmonton, Alberta T5L 0G7 Tel. (403) 452-6650	Engineering & Planning Consultants Specialize in water management development; Geological evaluation; Land use and urban planning.	G.E. Grant A.E. Moss B.Sc., M. Sc., P G.J.A. Kidd P. Eng. A.R. Pasini P. Eng. P.L. Wilson LL.B.
4)	Hedlin Menzies & Assoc. Ltd. Suite 800, 20 Victoria St. Toronto 210, Ont. Tel. (416) 360-1170	Economic and social policy; region development; and transportation economics	M.W. Menzies C.B. Davidson

FROM//
G. MAINLAND. 9/